Proportions of the Body

Worlds


Ex-libris
Charles Atwood
Kofoid

THE PROPORTIONS OF THE HUMAN BODY.

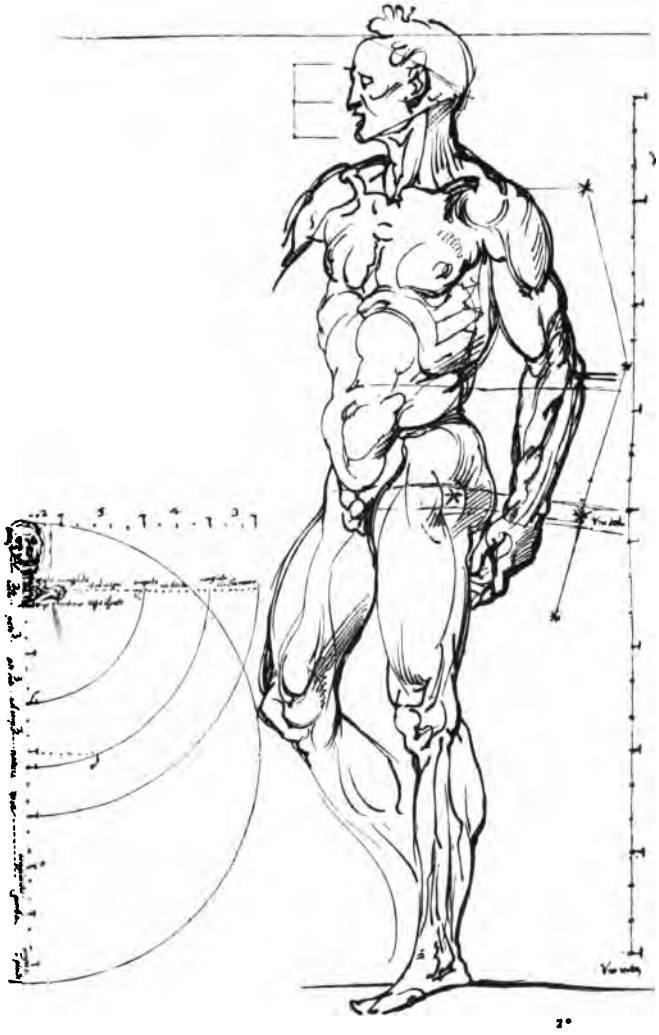


FIG. 1.—Drawing by Michel Angelo Buonarrotti, from the copper engraving by Giov. Fabbri (Choulant).

Prof. Alex. Reid, with kind regards from the Author.

THE PROPORTIONS

OF

THE HUMAN BODY.

BY

BERTRAM C. A. WINDLE, M.A., M.D., D.Sc.,

QUEEN'S PROFESSOR OF ANATOMY IN THE MASON COLLEGE,
PROFESSOR OF ANATOMY TO THE ROYAL SOCIETY OF ARTISTS,
AND LECTURER IN THE MUNICIPAL SCHOOL OF ART,
BIRMINGHAM.

LONDON:
BAILLIÈRE, TINDALL AND COX,
20 & 21, KING WILLIAM STREET, STRAND.
1892.

To

THE PRESIDENT AND MEMBERS

OF THE

ROYAL BIRMINGHAM SOCIETY OF ARTISTS.

PREFACE.

THE following pages were prepared and delivered as a course of lectures for the members of the Royal Birmingham Society of Artists. I have expressed my obligations to various books from which my information has been drawn, and should like here also to add the names of the following works, of which, as will be seen, I have made much use: Marshall, 'Proportions of the Human Body'; Duval, 'Artistic Anatomy' (English translation by Frederick E. Fenton; Cassell and Co.). I have to thank the publisher of the last work for permission to reproduce some illustrations. The subject of the proportions of the human body is one of great interest to artists, and if I have been able, by bringing together in one place the observations which have appeared upon it, to assist them in any way, I shall be well pleased.

BERTRAM C. A. WINDLE.

MASON COLLEGE, BIRMINGHAM,
October 1, 1892.

LIST OF FIGURES.

THE PROPORTIONS OF THE HUMAN BODY.

INTRODUCTORY.

In the course of lectures which, by the courtesy of the members of this society, I am permitted to commence this evening, I propose, so far as is possible to me, to lay before you an historical account of the various methods which have been invented in successive ages and by diverse nations, to establish a rule of proportion for the human body. So far as I am able I shall endeavour to criticise these various methods, and in conclusion I shall supply you with the best authenticated information as to the proportions of the human body, with the varieties which are due to differences of age, sex, or race. I do not know whether in this place, and to such an audience as this, any defence is necessary for one who presumes to offer hard definite scientific facts to those interested in the study of art alone. Is science, using the term now in a restricted sense, really of any use to the true artist? or is the true artist he or she who is from power of observation and force of genius able to grasp so completely and reproduce so fully all the characters of the human body, in their constantly varying complexity, as to be independent of all outside knowledge of cognate subjects? The question has been so well dealt with by one who is at the same time one of the most charming of writers and a skilled artist, that you will, I am sure, pardon me if I give you his words instead

of any of my own. 'The sciences of perspective, optics and anatomy,' he says, 'are useful to artists just as the science of geography is useful to a traveller. Take the very best of maps; what does it tell you of the countries you intend to explore? It is not a substitute for your observation as a traveller, but simply a reliable informant as to where the places lie, where you will find them, and a help to your topographic memory. After having studied the map you must observe the country itself in all its detail if you want to know its life. But the map has helped you, nevertheless, in the arrangement of the work before you. It has saved you time and trouble; it has prevented you from missing your way. What a map is to the traveller, scientific study wisely pursued is to the artist. It can never serve him as a substitute for his own observation, but it may tell him when to apply his power as an observer and guard him against innumerable mistakes. If artists could always have nature before them exactly as they desired to paint it, they might dispense with the help of science altogether. Any artist who sees quite clearly in the artistic sense, sees also as much of organic structure as is necessary to his perfect performance. But when nature is not present, or is constantly changing, which very nearly amounts to the same thing, artists need everything which may counteract the natural infirmities of the memory.'

Anatomy, rightly understood, whether for the artist or for the scientific student, is not merely the study of dry bones and the muscular masses which put them in motion, it is, or should be, far more. It includes the knowledge of the peculiarities of infancy, youth, or age; of sickness or robust health; of the contrasts between manly and muscular strength and feminine delicacy; of the appearances which pain or death presents. Such knowledge belongs to its province as much as the study of the muscles of the face when affected with emotion. And, as the writer just quoted proceeds, viewed in this comprehensive light, anatomy forms a science, not only of great interest, but one which will be sure to give the artist a true spirit of observation,

teach him to distinguish what is essential to just expression, and direct his attention to appearances on which the effect and force, as well as the delicacy of his delineations will be found to depend. But whilst anatomy is, to use Bell's phrase, the grammar of art, a complete knowledge of anatomy will no more make an artist than deep learning in grammar will make a master of composition. The trained observation of the artist will sometimes discover facts which have been missed by the anatomist. I may perhaps be permitted to make mention of an instance of this. An attack made upon the accuracy of the sculptor of the Venus of Milo on account of certain asymmetries in the face of that statue, led a German anatomist to examine the figure carefully. He found that whilst the portion lying below the nose was comparatively symmetrical, the upper part presented various deviations. Thus the nose deviates to the left, the left ear stands higher than the right, and the left eye is higher and nearer the middle line than the right. Struck by these facts, he was led to make careful observations of the measurements of skulls and of the heads of living persons. As a result he found that whilst symmetry of the lower half of the face is the rule, deviations such as those occurring in the statue commonly occur in the upper half. Anatomy can supply the artist with hard and fast rules arrived at from the study of averages. It is the truly great sculptor or painter who, appreciating that

> 'Variety's the very spice of life,
> That gives it all its flavour,'

and employing it,

> 'Not chaos-like together crushed and bruised,
> But as the world harmoniously confused,
> Where order in variety we see,
> And where, though all things differ, all agree,'

produces the masterpiece of art to be a joy to all succeeding generations. The quest for the ideal human figure upon which, as upon a scaffolding, the artist may build up the creature of his imagination, is one which has exercised many minds, some approaching it from what I may be

allowed to call the æsthetic direction, others from that of pure science. Hogarth, who states that there is no practicable rule by lines for minutely setting out proportions for the human body, and that if there were, the eye alone must determine us in our choice of what is most pleasing to itself, was yet desirous of showing the importance of appreciating the just proportions of the ideal human figure. 'I fear,' he says, 'it will be difficult to raise a very clear idea of what constitutes or composes the utmost beauty of proportion, such as is seen in the Antinous, which is allowed to be the most perfect in this respect of any of the antique statues, and, though the lovely likewise seems to have been as much the sculptor's aim as in the Venus, yet a manly strength in its proportion is equally expressed from head to foot in it. Let us try, however, and as this masterpiece of art is so well known, we will set it up before us as a pattern, and endeavour to fabricate, or put together in the mind, such kind of parts as shall seem to build another figure like it. In doing which we shall soon find that it is chiefly to be effected by means of the nice sensation we naturally have of what certain quantities or dimensions of parts are fittest to produce the utmost strength for moving or supporting great weights; and of what are most fit for the utmost light agility, as also for every degree, between these two extremes. He who hath best perfected his ideas of these matters by common observations, and by the assistance of arts relative thereto, will probably be most precisely just and clear in conceiving the application of the various parts and dimensions that will occur to him, in the following descriptive manner of disposing of them, in order to form the idea of a fine-proportioned figure. Having set up the Antinous as our pattern, we will suppose there were placed on one side of it the unwieldy elephant-like figure of an Atlas, made up of such thick bones and muscles as would best fit him for supporting a vast weight, according to his character of extreme heavy strength; and on the other side, imagine the slim figure of a Mercury, everywhere

neatly formed for the utmost light agility, with slender bones and taper muscles fit for his nimble bounding from the ground. Both these figures must be supposed of equal height, and not exceeding six feet. Our extremes thus placed, now imagine the Atlas throwing off by degrees certain portions of bone and muscle proper for the attainment of light agility, as if aiming at the Mercury's airy form and quality, whilst, on the other hand, see the Mercury augmenting his taper figure by equal degrees, and growing towards an Atlas in equal time, by receiving to the like places from whence they came the very quantities that the other had been casting off, when, as they approach each other in weight, their forms of course may be imagined to grow more and more alike, till, at a certain point of time, they meet in just similitude; which, being an exact medium between the two extremes, we may thence conclude it to be the precise form of exact proportion fittest for perfect active strength or graceful movement, such as the Antinous we proposed to imitate and figure in the mind.' It is with more exact methods than this that I have in these lectures to deal, yet would I crave your permission, before proceeding to them, to lay before you those luminous passages in which Sir Joshua Reynolds showed his appreciation of the existence of a type-form of the human body, together with his knowledge of the order which really exists under the seemingly indefinite variations from that type. 'All the objects,' he says, 'which are exhibited to our view by Nature, upon close examination will be found to have their blemishes and defects. The most beautiful forms have something about them like weakness, minuteness, or imperfection. But it is not every eye that perceives these blemishes. It must be an eye long used to the comparison of these forms, and which, by a long habit of observing what any set of objects of the same kind have in common, has acquired the power of discerning what each wants in particular. By this means we acquire a just idea of beautiful forms; we correct Nature by herself, her imperfect state by her more

perfect, and make out an abstract idea of forms more perfect than any one original. From reiterated experience and a close comparison of the objects of Nature, the artist becomes possessed of a central form from which every deviation is deformity. To the principle I have laid down, that the idea of beauty in each species of being is an invariable one, it may be objected that in every particular species there are various central forms, which are separate and distinct from each other, and yet are undoubtedly beautiful; that in the human figure, for instance, the beauty of Hercules is one, of the Gladiator another, of Apollo another, which make so many different ideas of beauty. It is true, indeed, that these figures are each perfect in their kind; but still, none of them is the representation of an individual, but of a class. And as there is one general form which belongs to the human kind at large, so in each of these classes there is one common idea and central form which is the abstract of the various individual forms belonging to that class. Thus, though the forms of childhood and age differ exceedingly, there is a common form in childhood and a common form in age which is the more perfect as it is more remote from peculiarities. But I must add further, that though the most perfect forms of each of the general divisions of the human figure are ideal, and superior to any individual form of that class, yet the highest perfection of the human figure is not to be found in any one of them. It is not in Hercules, nor in the Gladiator, nor in the Apollo, but in that form which is taken from them all, and which partakes equally of the activity of the Gladiator, of the delicacy of the Apollo, and the muscular strength of the Hercules. There is, likewise, a kind of symmetry or proportion which may properly be said to belong to deformity. A figure lean or corpulent, tall or short, though deviating from the type, may still have a certain union of the various parts which may contribute to make them, on the whole, not unpleasing.'

PART I.—HISTORICAL.

In considering the various systems of proportion it will be convenient to deal with them under the headings of the nations amongst whom they were originated or used. One of the earliest known canons is that given in an early Sanscrit work, the 'Silpa Sastra,' or 'of the fine arts.' In this canon a vertical line is divided into 480 parts, which are thus distributed throughout the body:

Upper part of Head	15
Face	55
Neck	25
Chest	55
To umbilicus	55
Lower part of Abdomen	53
To knee	90
Knee	30
Leg	102

If this canon be estimated in terms of the head, it will be found that the entire body is made to contain a little less than seven and a half heads. According to Quetelet, this scheme of proportion is met with in several of the paintings of Raphael.

The earliest information which we possess as to the canon of the wonderful Egyptian people is due to Diodorus Siculus. Unfortunately, this writer, who was a contemporary of Julius Cæsar and Augustus, though he travelled over a great part of Europe and Asia to collect materials for his 'Bibliotheca Historica,' is far from being reliable, and I only mention his stories because they find a place in most works on the subject with which we are concerned. According to this writer, the Egyptians divided the body

into twenty-one and a half parts, and worked under rules so rigid that the height of the statue once decided upon, the stones from which it was to be constructed were distributed to different workmen to be finally fitted together when all had completed their tasks. In illustration of this he tells a probably apocryphal story respecting the two sons of a certain Phœcus, of Samos, Taleclos and Theodorus by name, who, having studied art in Egypt, and employing the canon of that country, constructed a statue of Apollo Pythius in two halves. The height having been agreed upon, one half of the figure was executed by one brother in Samos, and the remainder by the other in Ephesus. On being placed together, when completed, it was found that they accurately fitted to one another. To understand the Egyptian works, certain points require to be borne in mind, the first of which is the conventionality by which they were, to a certain extent, bound down. Thus, in their sculptures in relief, the head was almost always represented in profile, but with a full-face eye, the bust was also full-face, the trunk three-quarters, and the legs profile. Again, the gods were represented larger than men, kings than subjects, and the dead than the living. The same conventionality of treatment was observed in the colours with which their sculptures were overlaid. The flesh tints of men were of a dark reddish-brown, and those of women a pale yellow. This scheme of colour is, however, occasionally departed from. Thus, at Sakharah, under the fifteenth dynasty, and at Aboo Sumbel under the nineteenth, there are represented men with skins as yellow as those of women, and in tombs at Thebes and Abydos, about the time of Thothmes IV. at Horenheb, and also at Bayt-el-Wely, flesh tints of rose-colour and crimson are met with. Then, in the second place, it must be remembered that the peculiar religious views of the Egyptians had an important bearing upon their art. The 'ka,' the double, or spirit of the body, was supposed to perish miserably if it had not the dead body, in the shape of a mummy, or at least a counterfeit presentment of the same, to attach itself to. Now, as

the mummy might be stolen, there were provided for the 'ka' in that case one or more figures of the deceased person. These were not intended as memorials for the children or friends to gaze upon, since they were shut up in rooms to which no entrance was afforded. In figures constructed for this purpose, extreme accuracy of facial resemblance was the only thing to be sought for, and we find, therefore, that whilst the head and face are most carefully represented, the remaining parts of the body were less accurately rendered—merely sketched in, if we may use such a phrase in connection with sculpture. It is obvious that figures executed under conditions such as these would not require any carefully devised canon of proportion for their construction. With respect to the manner in which the mural sculptures were executed, an interesting account is given by Jones in his handbook to the Egyptian Court of the Crystal Palace. He says, 'A wall was first chiselled as smooth as possible, the imperfections of the stone were filled up with cement or plaster, and the whole was rubbed smooth and covered with a coloured wash. Lines were then ruled perpendicularly and horizontally with red colour, forming squares all over the wall corresponding with the proportions of the figure to be drawn upon it. The subjects of the paintings and of the hieroglyphics were then drawn upon the wall, with a red line, most probably by the priest or chief scribe, or by some inferior artist, from a document divided into similar squares. Then came the chief artist, who went over every figure and hieroglyphic with a black line and a firm and steady hand, giving expression to each curve, deviating here and confirming there, the former red line. The line thus traced was then followed by the sculptor. In this stage there are instances of a foot or head having been completely sculptured, whilst the rest of the figure remains in outline. The next process was to paint the figure in the prescribed colours; and in some cases the painted line deviates from the sculptured line, showing that the painter was the more important workman, and that even in this

process no possible improvement was omitted. There are other instances where a considerable deviation from the position of an arm or leg has been made. After the sculpture was finished and painted, the part was recarved, and the defective portion filled in with plaster, which, having since fallen off, furnishes us with this curious evidence of their practice.'

Turning now to the canon adopted by the Egyptians, Jomard states that they used one of seven and a half heads as proved by measurements of a figure made by Delile. He also states that they made the foot one-sixth of the length of the body and the cubit one-fourth. These proportions are not true to nature as shown by the following table, which he supplies:

	Egyptian.	Natural.
Stature	24	26
Foot	4	4
Cubit	6	7

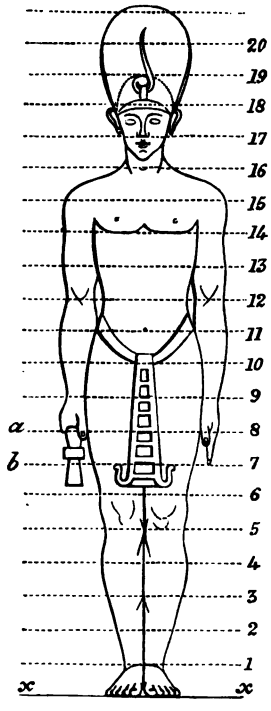


FIG. 2.—The Egyptian Canon, or Canon of Lepsius (Duval).

Blanc considered that the Egyptian canon was founded upon the length of the middle finger, which should be contained nineteen times in the body. Topinard calls this the canon of Lepsius, and states that the head and neck contain this measure three times, the upper extremity eight times, the inferior from the pubes, ten times, thus giving the relation of the upper to the lower extremities as 4 is to 5. The term 'canon of Lepsius' is due to the fact that in the 'Selection of Funeral Monuments' published by that author, there is a figure in which the body is divided by horizontal lines into nineteen parts (Fig. 2). Of this figure Duval says, 'As several passages in different ancient authors seem to indicate

that the Egyptian sculptors have taken the finger as the unit of the system, Charles Blanc very ingeniously remarks this fact, that in the figure in question, one of the horizontal lines, the eighth, beginning at the soles of the feet, passes exactly at the base of the middle finger in the right hand (closed, holding a key), while the seventh touches the extremity of the middle finger of the extended left hand. It seems to him, then, very probable that the distribution of these horizontal lines indicates a system of measuring the figure, and that the space between the seventh and the eighth lines measures the length of the middle finger, which thus becomes the standard of this system of proportion. According to the Egyptian rule, the length of the middle finger will be found nineteen times in that of the height; it may be that this rule was adopted by the Greek artists, and Charles Blanc does not hesitate to think that Polycletus, who has composed a "Treatise on Proportions," with a model in marble known by the name of Doryphorus, used no other system but the Egyptian; there has always been found in a number of antique figures this same proportion of nineteen times the middle finger to the height of the body, and in the Achilles, for example, the total height does not exceed by more than one-twentieth of an inch the length of the middle finger multiplied by nineteen.' MM. Perrot and Chipiez, whose position as authorities on Egyptian art stands very high, are inclined to doubt the existence of any fixed canon of stature in use amongst artists of this nation. They point out that though the figure above alluded to is contained in nineteen squares, others have been found in which the height of the figure occupies sixteen, twenty-two and a quarter, and twenty-three squares respectively. They look upon these squares not as related to a canon, but as being merely the method used to copy accurately from another, and possibly smaller, representation in the manner well known to artists, and alluded to in the description of the procedure of the sculptors as given above. There seems some possibility that the Greeks received their knowledge of a canon of stature from the Egyptians. Such a theory is supported by Blanc's state-

ment, by the stories of Diodorus Siculus, which probably had at least some foundation, and receives some confirmation from an incident related by Broca, the celebrated French anthropologist. M. Fock, in 1866, gave an order to Tramond, the well-known preparer of skeletons, to find him one with certain proportions, which he indicated, and which were those which he had obtained from the examination of the statue of the Apollo Belvedere. Tramond not being able to find a skeleton satisfying these requirements, particularly in so far as they concerned the fore-arm, applied to Broca. After a search, he found a skeleton which fulfilled the requirements. It was that of Abdallah, a superb negro from the Soudan, which is still in existence in the museum of the Society of Anthropology of Paris. Broca drew from this the conclusion, that the statue of the Apollo Belvedere was fashioned without doubt upon the Egyptian canon, which had been drawn up from Nubian negroes, who were used as models. Whether they obtained their canon from Egypt or not, there can be no doubt that rules of proportion were studied and employed by the Greeks. Schadow says that a canon was probably used in the workshops of the oldest Greek sculptors, and calls attention to the fact that in the group of the Æginetans in Munich, the proportions used for the wrestlers are the same. The most celebrated canon of which we have any knowledge was that of Polycletus, after whom Schadow's work is named. This artist was a native of Argos and a contemporary of Phidias, flourishing between the years B.C. 452-412. He was a pupil of Ageladas, and designed the temple and theatre of Epidaurus. He composed a commentary upon the proportions of the human body, and also constructed a figure in illustration of his views, the Doryphorus or Lancebearer, which he called the 'Canon.' This figure is mentioned by various old writers, Galen twice alluding to it as follows: 'Carvers, painters, sculptors and artists in general, strive to paint and represent the most beautiful forms they can find, whether of human beings or animals. Such a form is exemplified by the

canon of Polycletus. This statue owed its name to the fact that its parts are of perfect proportion and in harmony.' And again: 'The beauty of the human body is shown in the symmetry of the various parts, as clearly explained in the canon of Polycletus' (here the commentary is probably alluded to). 'In these writings the master has described his law of all the proportions of the body, and has illustrated this by means of a statue made in exact conformity with his rules. The name of canon was given by him both to his writings and to the statue.' Winckelmanns, in his 'History of Greek Art,' states that amongst the ancients the foot was the standard of all large measurements, and by its length sculptors determined the height of their statues, giving to them, as Vitruvius states, six lengths of the foot; for the foot has a more determinate length than the head or the face, from which modern sculptors and painters generally deduce the proportions of their figures. Hence Pythagoras calculated the height of Hercules from the length of his foot, with which he measured the Olympic stadium at Elis. As regards the number of heads in height, the various artists seem to have at times adopted different scales. Thus the Farnese Hercules and the Gladiator measure eight heads, the Apollo and the Laocoon seven and two-thirds, and the Antinous seven and a half. The Venus of the Medici has a similar measurement. We are ignorant of the exact rule which the Greek artists made use of, but various attempts have been made to arrive at it by measurements of various masterpieces. I here reproduce some of the figures arrived at by Quetelet:

Stature	1,000
Height of the head	130
Neck, from the chin to the clavicles	37
Trunk, from the clavicles to the pubis	306
Lower Limb, from the pubis to the ground	513
Lower Limb, from the perineum to the ground	482
Upper Limb, from the acromion to the extremity of the middle finger	455
Length of the hand	109
Length of the foot	149

A good idea of the variation in proportions may be

obtained from the following table, prepared by Professor Langer, of Vienna, which gives the measurements of certain parts of the body reduced to terms of the stature, which is considered as consisting of 1,000 parts.

Measures reduced to 1,000 parts of Body Stature.	Germanicus (so-called).	Apoxyomenos.	Apollo (Vatican).	Venus (Medicean).
Height of the head - -	127·3	119·0	117·5	127·5
Height of upper part of body (above symphysis pubis) - - - - -	480·0	446·2	461·5	470·4
Height of lower part of body (below symphysis) -	520·0	553·8	538·5	529·6
Difference between two last measurements - - -	40·0	107·6	77·0	59·2
Length of Thigh - -	220·4	264·8	233·5	235·0
Length of Leg - - -	221·0	266·1	267·8	260·0

It will be noticed that in the first and last the head is contained 7·8 times in the body, whilst in the second and third it is contained about 8·5 times. The effect produced by this difference of proportion, as well as by the other variations in measurement, is well shown by Fig. 3, from the same author, which gives linear schemes of the proportions of the so-called Germanicus (A) and the Apoxyomenos (B).

Winckelmanns states that the following rule of proportion for the face is, in his opinion, the exact method observed by the ancients. It was devised by Antonio Raphael Mengs. 'Draw a vertical line and divide it into five equal parts, the uppermost fifth is for the hair. Again divide the remainder of the line into three equal parts. Draw a horizontal line through the lower extremity of the first of these three divisions, forming with the perpendicular line a cross. The horizontal line must be as long as two of the three parts into which the length of the face is divided. Let curved lines be drawn from the extreme points of this line to the upper extremity of the fifth part originally set off; these form the smaller end of the oval of the face. Now divide one of the three parts of the length of the face into twelve equal portions. Let three of them, that is to say, one-fourth of one of these thirds, or one-twelfth of the

length of the face, be measured off on both sides of the point of intersection of the horizontal and perpendicular lines; these two portions indicate the space between the eyes. Let three other portions be measured off on both outer extremities of the horizontal line. The space which now remains included between the quarter at the outer end of the horizontal line and the quarter at the point of

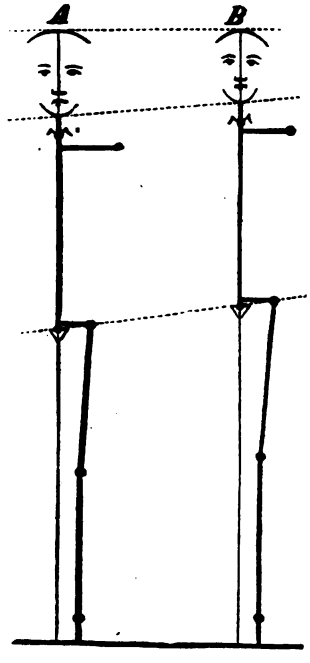


FIG. 3.—Linear scheme of the proportions of the so-called Germanicus and of the Apoxyomenos (Langer).

intersection of the two lines is equal to two quarters, or six of the twelve portions mentioned above, and gives the length of an eye. One quarter is the width of the eye, and also the distance from the tip of the nose to the opening of the lip, and from this point to the curvature of the chin, and thence to the tip of the chin. The breadth of the nose to the wings of the nostrils contains just a quarter. The length of the mouth requires two quarters; it is

therefore equal to the length of the eye, or to the height of the chin from its point to the line of junction of the lips. One-half of the face measured from the roots of the hair gives the length from the chin to the pit at the lower extremity of the neck. The German editor of this work notes that instead of 'and thence to the tip of the chin' we should read 'from the depression to the point of the chin is two portions.' He also points out that the length of the mouth is half as long again as the eye.

The best known Roman canon is that of Vitruvius, who flourished B.C. 46. According to this rule the head forms the eighth part of the body; the face, from the roots of the hair to the chin, is equal to the length of the hand, and forms the tenth part of the body. The foot is the seventh part, and the fore-arm and hand taken together is the fourth. Vitruvius is also the authority for the incorrect statement that the umbilicus is the central point of the body. He says, 'The umbilicus is naturally the centre of the body, so that if a man lies down flat on his back with his arms and legs stretched out, and if a circle be described with the umbilicus as its centre, the line will touch the points of the digits of both hands and feet.' He is also the authority for the statement that the height of the body is equal to the distance between the tips of the fingers when the arms are stretched out as far as possible from the sides.

Having thus described so far as they are known the canons adopted by ancient artists, we must now turn to the consideration of those of more modern times. Amongst the Italians, Giotto (1276-1336), is said to have written on the subject, but I am not aware that any remains of his writings are extant. Alberti (1398-1475) made a much more successful attempt than any other early modern to deal with the subject of proportion. In fact, Topinard says of his work that it is an essay in rational anthropometry, and a very remarkable attempt for the period. Alberti took the foot as his unit, and states that it is included six times in the body, in which he followed

Vitruvius and, according to Winckelmanns, various of the ancient sculptors. The foot he divided into ten parts, and each of these again into ten minutes, each of which thus formed the six-hundredth part of the body. Alberti's figures were based upon a number of measurements of the body relating to its height, transverse and antero-posterior diameters, and reduced to averages. Leonardo da Vinci (1445-1520), in his 'Treatise on Painting,' often mentions a standard of measurement, but never seems to have been satisfied with any. He took the face for his starting-point, and says that in his first infancy man has the width of his shoulders equal to the length of his face, and to that portion of the arm which is between the shoulder and the elbow when the arm is bent. It is also equal to the distance between the middle finger of the hand and the fold of the elbow, and to the interval between the bend of the knee and that of the ankle. But when man has come to his full stature all these measurements double in length, except the face, which, as the whole head, undergoes little change, and so the man who at adult stature is of a well-proportioned figure should have ten faces' height, the size of his shoulders should be two faces, 'and so all the parts of which I have spoken are alike of two faces.' He also says: 'Divide the head into twelve degrees, and each degree into twelve minutes, and each minute into twelve seconds, and so on until you have found a measure equal to the smallest parts of your figure,' a statement upon which possibly is based Rossi's surely sarcastic story that Leonardo had divided the face into 248,832 parts. Michael Angelo (1474-1563) left a sheet of proportions of which a representation is given in Fig. 1. It represents a man standing in three-quarter face, the head being in profile. The right arm is only partly shown, and the right leg and foot are incompletely represented. The skin is not removed, but the muscles are clearly shown, and the position of the left trochanter major is marked by a star. On the right side of the figure is a divided scale for the whole body, together with a special one for the arm. On the left side

is a smaller representation of the proportions of the human body, which shows the bony skull, the cervical vertebræ, the first rib, clavicle and upper part of the scapula. The corresponding proportions of the outstretched arm to those of the middle line of the body are shown by three quadrants. From the vertex to the sole of the foot is described a semicircle whose diameter is formed by the length of the body. Along the perpendicular line in the smaller figure are the words: testa, collo, peto (petto), soto peto (sotto petto), col corpo, natura, coscia, congiunta, gamba, congiata di piedi. On the horizontal line, spala (spalla), congionta, oso (osso) di sopra, congionto, oso di soto (osso di sotto), congionto, oso (osso) de la mano. Under the clavicle, inguiniatura sopra il petto. But Michael Angelo has stated his opinion that the artist must rely upon his own eye as the surest guide to correct proportions. A curious statement made by Lamozzo respecting Michael Angelo seems to have a bearing upon his ideas as to proportion, but it is phrased in as enigmatical a style as the directions of the alchemists, and to me is at least as unintelligible. Lamozzo says: 'And because in this place there falleth out a certain precept of Michael Angelo much for our purpose, I will not conceale it, leaving the farther interpretation and understanding thereof to the judicious reader. It is reported, then, that Michael Angelo upon a time gave this observation to the painter Marcus de Sciena his scholler; that he should alwaies make a figure pyramidall, serpent-like, and multiplied by one, two and three. In which precept (in mine opinion) the whole mysterie of the arte consisteth.' (The quotation is as given by Hogarth.)

Amongst other Italians who wrote about the canon of proportion may be mentioned Paggi (1554-1629), who in a work entitled 'Acus Nautica,' which was published in 1601, gave some tables of proportions from which it is believed those subsequently issued by Testelin were copied. Barbaro, in his 'Practica della Perspectiva,' gave a series of proportions which he proposed as intermediate between those of Dürer, which he considered to be too minute, and

those of Vitruvius, which, on the other hand, he thought too general. Barca of Milan (1620) issued a sheet containing the proportions of Jupiter, Hercules, Minerva and Venus.

The Germans, as might have been expected from a nation always anxious to reduce all possible matters to scientific rules, and filled with a genuine love of art, have supplied various works on our subject. Of these, perhaps the earliest, and certainly one of the most famous, is that of Albrecht Dürer (1470-1528), who had a very high opinion of the science of proportion, bestowed much thought upon the subject, and eventually published a work concerning it. His opinion of the potentialities of the subject was, in fact, almost overstrained, if one may judge from his statement that 'by means of outward proportion one can indicate the natures of men which correspond to fire, air, water, and earth, for the power of art is supreme.' His first book was entitled, 'Instruction in the Measurement, with the Compass and Rule, of Lines, Surfaces and Solid Bodies, drawn up by Albrecht Dürer, and printed for the use of all lovers of art, with appropriate diagrams, in 1525.' This book contains a course of applied geometry in connection with Euclid's elements; in fact, Dürer states from the commencement of it that his book will be useless to anyone who understands the geometry of 'the very acute Euclid, for it has been written only for the very young and for those who have no one to instruct them accurately.' This work was followed by his book on Proportion, which was published with the following title: 'Herein are comprised four books on human proportions, composed and printed by Albrecht Dürer, of Nürnberg, for the use of all those who love this art, MDXXVIII.' In his system of measurement of the human body he adopts two plans, for in the first book he uses as a standard a fraction of the entire height, whilst in the second his scale is composed of six hundred parts, like that of Alberti, a proof, says Thausing, that he had some acquaintance with the, at that time unpublished, writings of the Florentine. In the third

book the varying proportions of the figures given in the first two are changed according to definite rules, the scale being increased and diminished in all kinds of different ways, but always with a certain consistency. The fourth book indicates 'where and how the figures are to bend.' It is, in point of fact, 'an application of the science of geometrical projection to the drawing of the human body expressed by lines and plane surfaces, and represented under different aspects and in different positions.' He declares in his preface that he intends to write nothing about the inward parts of the body, and at the beginning of the fourth book says: 'But how to describe the limbs, and how wonderfully they fit into each other, is known to those who occupy themselves with anatomy, and I leave it to them to speak of these things.' He himself is content with briefly pointing out the limits within which the body can be bent, and how the joints become enlarged when they are stretched and in action. In the first book he gives figures of bodies varying from six to nine, and even ten, heads in stature, though the latter proportions are only treated as supposititious cases, and not as actually occurring conditions. Thus he represents a pair of robust peasants, male and female, in whom he makes the foot one-sixth, the head one-seventh, and the hand one-tenth, of the entire stature. He then gives another pair of figures, also male and female, of a less robust and more slender form, in whom the head is one-eighth, the hand one-tenth, and the foot, in the male, one-sixth, and in the female one-seventh, of the entire stature. 'The vertical and horizontal lines into which he divides the head,' says Topinard, 'merit special attention. He established his first horizontal line to orient the head in profile, and drew it so as to pass by the lower part of the lobule of the ear and the lower part of the nose. Amongst the other lines are two called slanting—the one a tangent to the chin and to the two lips, the other a tangent to the frontal eminences, to the glabella and to the nose. At the point of meeting of this line with the horizontal line above mentioned is an angle which the

authors of the "Crania Ethnica" have described as a sort of facial angle which preceded that of Camper. It is a fact that on a figure of a negro given by Dürer, in which the two lines are represented, the angle is more acute than amongst Europeans, and the forehead therefore rendered more retiring.' Very different opinions seem to have been held respecting the value of Dürer's work; Michael Angelo is said to have thought but little of it, whilst Hogarth, in the book from which I have already quoted, says: 'Albert Dürer, who drew mathematically, never so much as deviated into grace, which he must sometimes have done in copying the life, if he had not been fettered with his own impracticable rules of proportion.' On the other hand, Francisco Pacheco, the master of the great Velasquez, in his book on painting, recommends that the female figure should be studied from Dürer's drawings, instead of from the living model. Passing to other Germans, Bergmuller, who published in 1723 a book entitled 'Anthropometria,' Lichtensteger and Zeising, all devised canons which were more or less fantastic and artificial. The last-named author published his 'Lebre von der Proportionen' in 1854, the details of which rested upon the following proposition: Proportion is a fundamental necessity for beauty of form; if the division of a whole consisting of unequal parts is to appear proportional, the relation of the unequal parts to one another must be the same as the relation of the parts to the whole; that is, the smaller parts must be related to the greater, as the greater to the whole. From this rule he deduced his so-called 'Goldenen Schnitt' as a canon of ideal beauty in the division of all structures. This section consisted in a line so divided that the smaller part bore the same portion to the larger as that did to the whole.

Schadow, who was sculptor at the court of the King of Prussia, published in 1834 his work on proportions, entitled 'Polycletus,' a name which was that of one of the earliest devisers of a canon, the author of the celebrated 'Doryphorus.' Of Schadow so great an authority as

Quetelet had a high opinion within certain limitations. 'We find him,' he says, 'an artist before all things: that which unceasingly occupied him was grace, was the elegance of forms, much more than the law of proportions and of stature, and he is correct up to a certain point.' In his system he describes the face as the portion between the upper part of the orbit and the lower part of the chin, and he states that this distance is in a full-grown man five inches. He divides this space into six parts, the first extending to midway between the orbit and the lower limit of the nose, the second to the last-named point, the third to the angle of the mouth, the fourth midway from this to the chin, and the last to the point of the chin itself. The foot of a man of five foot six inches in stature should be ten inches—this is the same length as the ulna, and both are, therefore, double the length of the face according to his definition of that region. In the female the face is four and a half inches, and the foot nine; whilst in the child the head is six and a half inches, and the foot five and a half. One of the most interesting attempts to solve the question of proportions is that of Carus, the celebrated Dresden physiologist, who published a work called 'Die Proportions-Lehre der Menschlichen Gestalt' in 1854. His views are well expressed in a letter to Quetelet, which the latter quotes. He says: 'I have considered the proportions of man as an object of morphology, and I have tried to find in consequence physical laws to fix that which we may call the canon, or, according to the expression of architects, when they are dealing with the column, the module, of our organization.' Having then given an account of the progress of his ideas, and having stated that the statuary Rictochel had made a figure from his directions, he proceeds: 'It is twenty years and more since I repeated in several places in my writings if anyone wishes to find the true key to our proportion he must set out with the vertebral column, which is, so to speak, the true organic ell divided into twenty-four inches (free vertebræ). When the ovum of a mammal is opened at the commencement of its

formation there is found, as the first model of the future animal, the germinal area grooved in the middle with a line, which becomes the vertebral column at a later period. This line elongates, and in time there may be observed, as a model somewhat more complete of the future animal, a division of this line by the rudiments of vertebræ. To speak correctly, this form is then the first canon of all the other organs of the future skeleton, for after the manner of its production and development should be regulated all the organism. There are extremely interesting relations when the ratios of the length of the free vertebral column are examined in the new-born child and in the adult. In the first (*i.e.* at the end of fœtal life) it is found that the length of all the twenty-four free vertebræ—from the atlas to the last lumbar vertebra—correspond in a normal infant precisely to one-third of the same column of free vertebræ, consisting of twenty-four vertebræ, measured in the adult at the end of the epoch of growth by a line from the spine of the atlas to the spine of the last vertebra.'

The modulus, therefore, which he employed, and which he considered to be both physiologically and philosophically justified, was one-third of the length of the human spine. By applying this rule, then, it ought, in his opinion, to be possible to draw the various parts of the body with mathematical accuracy. 'His investigations,' says Sir George Humphry, 'conducted with all the assiduity and accuracy which characterize the German anatomists, appear to justify the selection, for he found the various parts of the frame to correspond in a remarkable manner with this standard. Thus the length of the skull from the forehead to the occiput equals one module. The height from the vertex to the lower margin of the upper jaw is the same. The circumference of the skull is three modules, or the whole length of the spine. The length of the breast-bone and of the shoulder-blade is in each case one module. The width of the chest from the extremity of one clavicle to that of the other is two modules. In the pelvis each of the measurements from the highest point of the

ilium to the symphysis pubis, from the anterior superior spine to the tuber ischii, and from one anterior inferior spine to the other, corresponds with one module. The arm and fore-arm give three modules and the hand one. The thigh-bone gives two and a half, the tibia two, and the foot, from the ankle to the tip of the toe, one. The height of the body is nine and a half modules. The module measures eighteen centimetres, or rather more than seven inches, making the entire figure five feet six and a half inches, or five feet seven inches. These,' he proceeds, 'are the ideal proportions of the well-developed European, deduced from the measurements of numerous skeletons. They represent the mean between the male and the female, and are stated by Carus to be generally true, though not applicable with mathematical accuracy to any one person, slight deviations from the standard being essential to the endless varieties of individual form. The measurements which I myself have made for the purpose of testing the value of this means of determining the scale of proportions of the figure, though in a general manner confirmative of the results obtained by Carus, have proved that the exceptions to the rules laid down by him are very numerous.' It has been already mentioned that Carus caused to be constructed, according to directions drawn up by himself, a statuette or canonical figure, as he called it. Of this he says: 'No sex has been assigned to this little statue, and it is easy to see that, in order to form a living individuality, the modulus or canon must always be made to vary slightly. For instance, if I wished to depict a woman's body I should give a little less breadth to the shoulders, and I should make some members more voluminous; while I should act exactly the contrary in the case of a man. In the same way the individualities might be varied: if I wished to represent a Cicero or a Leibnitz I should give to the head more than a module in height and length, and less at the extremities; on the other hand, if I wished to represent an athlete or a giant, I should add to the limbs, and should take ten modules or more as the height of the whole body.

By this means one could even succeed in depicting every sort of expression by an algebraical formula, where one would have the same elements, but increased or diminished in their value.' Mr. Roberts' criticism of the foregoing facts and figures is of so much interest that I shall here quote it. 'Thus,' he says, 'it appears that Professor Carus uses his "canon" either as a kind of artist's lay-figure, which he dresses out according to his fancy, or as a skeleton, which he clothes with flesh according to his anatomical and physiological knowledge — knowledge, it must be remembered, which must be first obtained from actual observation and measurement of the living model. The canon may, indeed, be theoretically correct, but it can be of little practical use for scientific purposes. The greater breadth of shoulders required to convert the statue into the figure of a man must first be determined by actual measurement, as must also the greater breadth of pelvis to convert it into the form of a woman, before we can be satisfied that it represents the natural human form. The difficulty would be still greater if it were attempted to represent any decided deviation from the typical form. In the case of a giant, for instance, it is not sufficient to add half a module in equal proportions to the nine and a half modules representing the stature of an ordinary man in order to produce the giant; for actual observation and measurement show that the size of the head and trunk of giants differs little from those of men of ordinary stature, and that the excess of height of the former is chiefly due to an unusual development of the lower extremities relatively to the rest of the body. Professor Carus' canon, moreover, renders no assistance to the study of the progressive development of the body, as we know that the different parts of the body develop at various rates. Thus, in the young child the middle point is near the navel, but in the adult man it is below the pubis.'

Liharzik of Vienna proceeded by the method of averages, his figures being drawn from measurements of three hundred persons, and his researches extending over seven

years. He makes the following statements: The distance above the pubis is to that below as 81 is to 94. The length of the forearm and the hand taken together is to that of the arm as 91 is to 63. The height of the head and neck taken together is to that of the body as 33 is to 175. The length of the foot is equal to that of the forearm. The length of the hand is equal to that of the clavicle, and both are equal to six-sevenths of the forearm or to two-thirds of the humerus. The distance from the centre of the trunk to the extremity of the middle finger is equal to one half the stature.

Amongst the French the older writers on the subject of proportion may be briefly dismissed, though those of a later period will require a longer consideration. Cousin (1502-1590) is the author of a system in which the limbs are enclosed in squares, and the head and neck and the torso in quadrilaterals. Certain of his figures will be referred to hereafter. Poussin (1594-1665) dealt particularly with Leonardo da Vinci's ideas. Testelin (1616) was the author of a work entitled 'Conférences de l'Académie avec les Sentiments des plus habiles Peintures.' His proportions are supposed by Schadow to have been copied from the 'Acus Nautica' of Paggi. Pader (1649), in his 'Traité de la Proportion Naturelle et Artificielle des Choses,' gave exact copies of Dürer's figures, although he only mentioned that artist in his preface. Bardon of Marseilles gave similar tables to those of Testelin, and Horace Vernet, with others, also wrote on the subject of proportion. Gerdy, in his 'Anatomie des Formes Extérieures du Corps Humain,' published in Paris in 1829, set himself the task of finding simple proportions for the human body. He divided the head into four equal parts, and made it the eighth part of the body. The trunk contained three heads, the first from the chin to the nipple, the second from the nipple to the umbilicus, and the third from the umbilicus to the pubis. The lower extremity contained four heads, two from the pubis to the spine of the tibia below the knee, and two more from this point to the

ground. The upper extremity contained three and a quarter heads, one from the shoulder to the front of the elbow, a second from thence to the wrist, and the third from this point to the extremity of the middle finger.

Of this system Quetelet says: 'The relations expressed by the table are extremely simple; but in order to obtain this simplicity it has been necessary to make great sacrifices of truth.' According to Topinard, the canon most in use in French studios is that of Cousin, somewhat modified by Blanc. In this canon the whole body is divided into thirty parts, four of which, equivalent to the seventh and a half part of the body, are allotted to the head, nine to the trunk from the supra-sternal notch to the genitalia, two to the neck, and the remaining fifteen to the lower extremity, of which fifteen, six are allotted to the thigh from the genitalia to above the knee. Topinard gives the following table as the canon of the studios, the total stature equalling 100.

Head	Vertex to roots of hair	-	-	1 nose,	3·3	13·2
	Roots of the hair to root of the nose			1 „	3·3	
	Root of the nose to its base	-	-	1 „	3·3	
	Base of the nose to the chin	-	-	1 „	3·3	
Neck	Chin to supra-sternal notch		½ head	2 „	6·6	6·6
Trunk	Supra-sternal notch to edge of pectoral	-	-	1 face	3 „ 9·9	29·7
	Pectoral to umbilicus	-	-	1 „	3 „ 9·9	
	Umbilicus to root of penis	-	-	1 „	3 „ 9·9	
Inferior Extremity	Penis to above the knee	-	-	1½ head	6 „ 19·9	53·0
	Knee	-	-	½ „	2 „ 6·6	
	Below the knee to the instep	-	-	1½ „	6 „ 19·9	
	Instep to the ground	-	-	½ „	2 „ 6·6	
					102·5	
Superior Extremity (Cousin).	Shoulder to upper part of wrist	-	-	1¼ „	8 „ 25·0	37·5
	Wrist	-	-	¼ „	1 „ 3·1	
	Hand	-	-	1 face	3 „ 9·3	
	Shoulder to elbow	-	-	1¼ head	5 „ 15·6	40·6
	Elbow to upper part of wrist	-	-	1 „	4 „ 12·5	
	Hand and wrist	-	-	1 „	4 „ 12·5	
Various	Span of arms is equal to the stature.					
	Maximum breadth of the shoulders is equal to ¼ the stature (Blanc).					
	Maximum breadth of the hips is equal to ⅕ the stature (Blanc).					
	Clavicle to pubis or trunk; Ilium to patella or thigh; Patella to ground or leg — are equal (Cordier).					

In examining this table it should be remembered that, in Blanc's canon, the nose is the 30th part of the body, and is therefore to the stature as 3·33 is to 100. In that of Cousin, the nose is the 32nd part, or 3·124. The head, in that of Gerdy, is 12·5 parts of the 100 comprised in the stature. I shall have occasion further to quote from the great French anthropologist Topinard when dealing with the differences of stature in different races, and with other points at a later period; but this will, perhaps, be the best place to quote his remarks upon the standard European canon, which, on account of their importance, I shall give *in extenso*. He points out, in the first place, that in order to arrive at really accurate results it would be necessary to obtain thoroughly accurate measurements of at least one hundred absolutely typical Europeans, measurements of which, at the time of writing his book, he was not possessed. 'However,' he says, 'as it is urgent that we should possess a standard of comparison to which a traveller can refer his measurements, so that he may be understood when he says that in a certain population the upper or lower extremities are long or short, and since, naturally, the European nations are those on which such a canon should be based, I have set aside my scruples and devised a canon relating to the adult male of our countries of about 1·65 m. in stature. In order to do this I have put together all the partial results on which I believe that I can rely, have taken into account my own measurements, and have adopted the most justifiable compromise amongst them all. The canon of proportion for the anthropologist, I need scarcely say, is the vertical figure of a man divided into one hundred parts, in which are represented the segments of the body, each with the number of parts which enter into its composition in the vertical as well as in the transverse directions—so far, at least, as possible. I have not considered it necessary,' he proceeds, 'to endeavour to obtain an approximation nearer than that of 0·5, although two-tenths added or subtracted from any part of the body have often a great importance in the differentiation of races

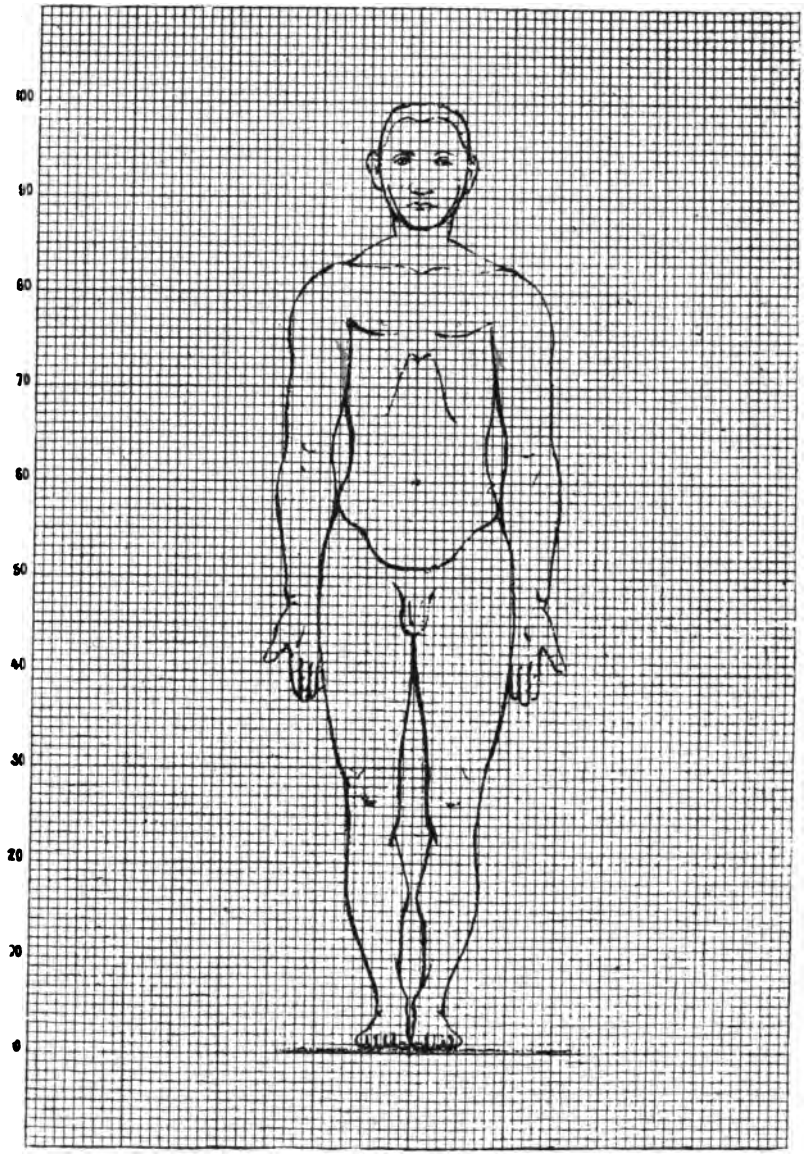


FIG. 4.—Scheme of proportions of Paul Topinard.—The human body divided in the vertical direction into one hundred equal parts.

from this aspect, and in the determination of the influences of environment and of education on the proportions. The following table gives the elements which have served for the construction of the figure:

Mean canon of the European male. Stature = 100.			
	Head, vertex to chin	13·3	100
	Neck, chin to supra-sternal notch	4·2	
	Trunk, notch to seat	35·0	
	Inferior extremity, seat to ground	47·5	
Superior Extremity	Arm, acromion to olecranon	19·5	45·0
	Fore-arm, olecranon to styloid process	14·0*	
	Hand†	11·5	
Inferior Extremity	Thigh, seat to centre of knee	20·0	47·5
	Leg, knee to malleolus	23·0	
	Malleolus to ground	4·5	
	Foot	15·0	
	Height of umbilicus	60·0	
	„ „ pubis	50·5	
	Span of arms	104·4	
	Maximum width of shoulders	23·0	
	„ „ pelvis	16·9	
	„ „ hips	18·8	

'It will now be interesting to compare the canon which has just been given with that already stated as the canon of the studios. The chief differences are as follow: The head, higher than that of Cousin and Gerdy, is practically the same as that of Blanc; that is to say, it is contained seven and a half times in the stature. The neck, which all artists find too long in the canon of Blanc, is nearly that of Cousin. The inferior extremity in its entire length, estimated by the height of the pubis to permit of comparison, is notably too long in the system of Blanc. It is, on the contrary, too short in the two canons of Cousin and Gerdy; the divisions are bad in the system of the latter. The span of the arms used by artists is absolutely false, for it is equal to the height only once in every ten cases. The shoulders and the hips are too large, and the umbilicus is too high. The height of the pubis can only

* The line of separation between the arm and fore-arm is here taken at the superior part of the olecranon.

† 'This proportion, being the total of the three segments of the limb, is less when the member is measured in a straight line from the acromion to the extremity of the middle finger. I have considered, however, that this difference might be neglected.'

be measured approximately, but it has an exceptional importance, because it is in its neighbourhood that the centre of the body in the vertical direction is to be found. M. Sappey, whose measurements relate especially to this point, places it 13 mm. below the pubis, at the root of the penis. This agrees very well with my conclusions, but not with the canon of Blanc, which places it lower still.'

Before leaving for the present the observations of Topinard, to which I shall have again to recur, it should be remembered that his conclusions are of the greatest weight, being based upon accurate measurements and comparisons. They will be used as a touchstone by which the various canons may be judged at a later part of this work.

In Spain, Philip Borgogna is the author of a system which estimates the stature of the adult male as being equivalent to nine and one-third times the height of the face. Juan de Arphe y Villafãne, who, like Borgogna, studied at Toledo, published in Seville, in 1585, a work entitled ' Varia Commensuracion para la Escultura y Arquitectura,' in four books, of which the second dealt with human proportions. According to Choulant, this book contains a large number of plates, some of which give figures of the whole body, and others separate portions thereof, with scales of measurement, from which we gather that the author had seen Dürer's figures of proportions. The representations are, however, more true to nature, more living and more spirited. Two male and two female figures are represented, in each of which the stature is made equal to the length of the faces. Chrisostomo Martinez (1650-1691 or 4) was the author of a work in which appeared the plate represented in Fig. 5. According to Quetelet, he made the stature contain eight heads. It may be noted of this last writer, that his figures of skeletons were regarded by the great anatomist Winslow as models of what such drawings should be.

In Holland, S. van Hoogstraeten, born at Dordrecht in 1627, published at Rotterdam in 1678 his 'Polymnia,' in

which he gave three plates illustrative of the proportions of man. In the first plate he represents two men, one being fifteen, the other sixteen, palms in height; and as his head

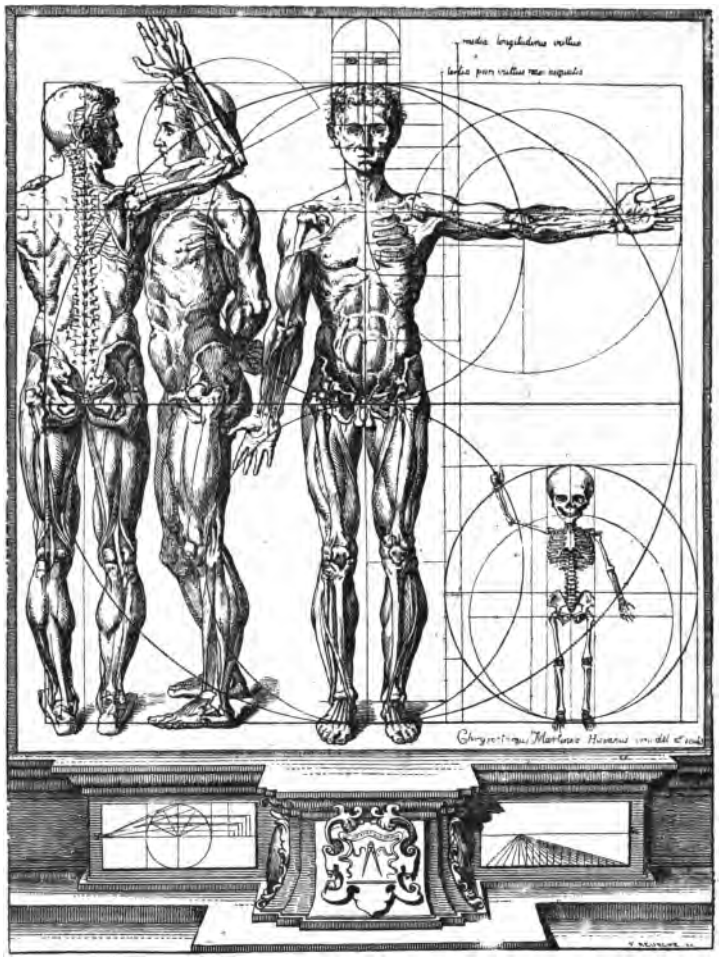


FIG. 5.—Plate by Chrisostomo Martinez (Choulant).

contained two palms, it follows that these two figures were respectively of seven and a half and eight heads in height. In his second plate he represents a female figure divided into fifteen parts: seven of these are from the ground to the

genitalia, and seven from this point to the line of the eyes, by which method of division the legs are made shorter than the upper part of the body. The arms and hands of both his male and female figures are made too short.

In Belgium, Johan de Laet, of Antwerp, published an edition of Vitruvius, in the appendix of which he quotes Pomponius' canon, as given in his work on sculpture, as being nine faces. Geerardt de Lairesse (1640-1711) makes the following statements: 'The eyes are at such a distance apart that a third can be placed between the two. The nose is one-third of the length of the face. The mouth is as large as an eye. The ears are at the level of the eyes above and of the nose below, however long or short it may be.' Van Brée of Antwerp published in 1821 his 'Leçons du Dessin,' in which he uses the head as a modulus, dividing it into four parts. This writer, who was the first professor in the Academy at Antwerp, gives in his books a number of measurements from ancient statues, which are, however, according to Quetelet, of doubtful accuracy. The most useful work which has appeared in Belgium, an epoch-making book, is that of the last-named author—'Anthropométrie ou mesure des différentes Facultés de l'Homme.' In this work Quetelet commenced by giving a sketch of the labours of former writers in the same field, to which I have to express my indebtedness for many of the facts which I have laid before you. Having thus cleared the ground, he proceeds to give the result of his own observations as to the proportions of the adult male and female body, the laws of growth, the influence of locality, food, profession, and other factors of the environment upon the stature and proportions. As I shall have to mention many of his observations at a later stage, I shall not in this chiefly historical portion delay longer over his writings. I have now to pass to the English writers on the subject of proportion, to whom Quetelet pays the high compliment of saying that 'amongst the different schools which have occupied themselves with the proportions and symmetry of man, there is, perhaps, none which has considered this important subject

from a higher and juster standpoint than that of England.' In the first rank he mentions Sir Joshua Reynolds, some of whose observations I have already quoted. Flaxman, in his lectures on Sculpture, has dealt with the same question. John Chamberlain published in 1796 a book in reversed writing, in which he reproduced Leonardo da Vinci's designs. The late John Marshall, who filled the Chair of Anatomy in the Royal Academy, published a work on the Proportions of the Human Body, of which it will be necessary to give a more detailed account. He divided the axial portion of the body into four principal parts, to each of which again he assigned nine units. Thus the head, neck and trunk, are divided into thirty-six portions. The four portions are thus allotted; the first is the head, which he thus takes as his standard, though dividing it into nine, and not, as many earlier writers had done, into four parts. The second is from the chin to near the lower end of the sternum, a little below the nipples. The third extends from this point to the highest part of the crest of the ilium, and the fourth is placed one unit and a half below the tuberosity of the ischium, that is to say, half a unit below the gluteal fold. I cannot give all his figures, which can be easily consulted by those desirous of pursuing the subject further, but some few are of such importance as to require mention now, whilst I shall return later to the consideration of others. The upper extremity, according to his system, contains twenty-nine and a half units, and the lower forty-one. The entire stature contains sixty-seven units. Now, as the mean height of the inhabitants of the British Isles is 67·3 inches, it follows that his unit is, in the case of the average man, very nearly equal to one inch. Again, if the number of units be reduced to heads, it will be found that the entire stature includes seven heads and four units, or very nearly seven and a half heads, which, from all accurate observations, we may regard as the correct estimate, the classical canon of eight heads to the body making the head too small. In another place he mentions that the supra-sternal notch is equal to

one unit. His comparison of the stature of the female with that of the male is also of much interest. The axial portion of the female he also divides into four parts, each containing nine units, but in this case the units are proportionately smaller than those of the male, being in the proportion of ·933 inches to 1 inch. The four divisions in the female are, first the head, second from the chin to the lower part of the sternum just below the nipples, the third to the upper part of the pelvis, and the fourth to half a unit below the tuberosity of the ischium. The gluteal fold being one and a half units below this, it follows that the female axis is one and a half units longer than four heads. Thus the trunk of the female is proportionately longer than that of the male. The stature of the female is sixty-seven and a half units, or exactly seven and a half heads, and thus the head in the female is slightly smaller proportionately than that of the male. The lengthened proportions of the female torso are due to three facts. First there is a proportional or actual elongation of the spine, and especially of its lower portion, the lower limit of the third of Marshall's divisions reaching in the female to the upper part of the fifth lumbar vertebra, and in the male to the lower part of the same vertebra; secondly, there is a greater arching of the lumbar column, making the anterior wall more convex supero-inferiorly; and, thirdly, there is the greater obliquity of the pelvis, which also causes a lowering of the hips. Before leaving the English writers, I should not omit to mention Mr. Roberts' book, 'A Manual of Anthropometry,' published in 1878, which, though not primarily intended for artists, contains many useful figures and observations to which I shall have shortly to recur.

In concluding this historical part, it may be convenient to tabulate the names of the authors who have dealt with the subject of the Proportions of the Human Body. I also add the names of several works in which the student who is desirous of pursuing his studies in the history of the subject further will find more full information.

YEARS.	ITALY.	FRANCE.	GERMANY.	BELGIUM AND HOLLAND.	ENGLAND.	SPAIN.
0	The two Plinys, Vitruvius					
300	Philostratus					
1300	Cimabue, Giotto					
1400	Ghiberti					
1450	L. B. Alberti, Ghirlandajo, A. Verrochio					
1500	Perugino, Bramante, L. da Vinci			Hubert and Jan Van Eyck		
1525	Raphael, Michael Angelo, Mazzuoli		Albrecht Dürer	Van Orley		A. Berruguetto
1550	Firenzuola, Bandinelli, Ruscelli, Cardi		Lucas Cranach, Jan Holbein			
1575	Luca Longhi, Lomazzo, L., Aug., and Annib. Carrachi	J. Cousin				J. y Villafañe
1600	B. Paggi					
1625		N. Poussin		Rubens, Van Dyck		
1650		Hilaire Pader	Von Sandrart	Rembrandt		
1675		H. Testelin, J. B. Corneille		S. van Hoogstraeten		C. Martinez
1700		A. Audran	Daniel Priesler, Bergmuller	G. de Lairesse, J. de Witt		
1725		Gérard Audran, Dugrez, Ch. Ant. Jombert, N. Cochin				
1750	Volpatto	Bouchardon, André Bardou, Cochin fils	Ant. Raph. Mengs, J. Winckelmanns	Bd. G. Camper	Jos. Reynolds, Jno. Chamberlain	
1775		Watelet, Buffon	G. Lichtensteger, Meil	M. van Brée	Flaxman	
1800		David	Pflugfelder, J. Mattersberger			
1825		Gerdy	Schadow, Sömmering	Martinet	D. Granville	
1850	G. B. Sabattini	H. Vernet	Carus, Zeising, F. Liharzik, C. Schmidt, G. Röber	Fock	Hay, Bonomi, Humphry	
1870		Topinard		Quetelet	Roberts, Marshall	

Books dealing with the History of the Subject.

Schadow, J. G., Polyclet oder von den maassen des menschen, nach dem geschlechte und alter mit angabe der wirklichen naturgrösse, u.s.w. Folio and 4to. Berlin, 1834. (German and French.)

Quetelet, L. A. J., Anthropométrie ou mesure des différentes Facultés de l'Homme, 8vo., Bruxelles, 1870.

Topinard, P., Eléments d'Anthropologie Générale, 8vo., Paris, 1885.

Choulant, L., Geschichte und Bibliographie der Anatomischen Abbildungen, u.s.w., Leipzig, 1852.

Roberts, C., A Manual of Anthropometry. London, 1878.

PART II.—CRITICAL.

In the foregoing pages I have endeavoured, though necessarily briefly, to lay before you an account of the labours of the numerous workers in the field of proportion. It remains for me to point out, so far as they are known, what exactly are the proportions of the human body, and how and under what circumstances they undergo modification.

Before doing so, however, it may be well to call attention to two points which strike one forcibly in reviewing the history of the subject. The first is, that the credit of commencing, and for many years carrying on this study, is due to artists, and not to men of science. Long before Anthropometry as a branch of Anthropology had taken its place as an object of scientific study, artists in many countries had devoted their time and attention to endeavouring to ascertain and lay down for their own guidance, and for that of their pupils, a law of proportion for the human body. But when the scientific study of the measurements of the human body was commenced, an important difference between the methods which were then adopted and those of the preceding workers at once became apparent, and this is the second point upon which I wish to dwell. What the artist observers, very naturally, had chiefly striven after, was grace and elegance; what the scientific observer sought was absolute accuracy. The artist had in some cases, as in that of Sir Joshua Reynolds, contented himself with giving a poetic, or perhaps it would be more accurate to say a purely æsthetic explanation of the proportions of the body, or in other cases he was led

away by his artistic feelings into giving rules for the construction of impossible or non-existent forms. And in this they were followed by some of the writers representing the science of their day. I have a curious book by William Salmon, the author of an English edition of 'Diemerbrock's Anatomy,' himself a professor of physic, which is entitled 'Polygraphice, or the Arts of Drawing, Engraving, Etching, Limning, Painting, Washing, Varnishing, Gilding, Colouring, Dyeing, Beautifying and Perfuming.' It also contains incongruously enough 'The one hundred and twelve Chymical Arcanums of Petrus Johannes Faber, a most learned and eminent Physician, translated out of Latin into English, and an Abstract of Choice Chymical Preparations, fitted for Vulgar Use, for curing most Diseases incident to Humane Bodies.' It was evidently a popular book, and one of which the author was proud, for the copy in my possession is stated to be 'The fifth Edition; Enlarged with above a thousand considerable Additions; Adorned with XXV. Copper Sculptures; the like never yet extant.' In his fourteenth chapter, Salmon gives an account of human proportions, to which he adds directions how to make a 'side way head,' and how to describe the 'fore-right face.' He commences by stating that the length of an upright body is equal to eight times the length of the face or head, thus falling into the error of the ancient writers. But he afterwards proceeds to give instructions for the proportion of a man of ten faces, the face being the same as what we now call the head, since the first of his ten equal divisions begins at the top of the head and reaches to the root of the chin. He also gives the proportions of a man of eight faces, of a young man of nine faces, and finally the proportion of a body of seven heads, which last I shall quote, since I think it affords a key to the idea which permeated this custom of drawing figures of different proportions. He says, 'The length from the crown of the head to the sole of the foot is seven times the length of the head; this is a large head, and all the members and limbs are answerable to it—viz., strong,

sturdy, and raised. Yet the ancient Grecians painted only the goddess Vesta with this proportion, it being grave and matron-like. But you may give it to any other goddess which has any kind of grave or solid resemblance, as also to the more staid and ancient sort of women, to Sibylls, Prophetesses and such like, whom to draw with a slender and delicate proportion would be a great oversight—as also to draw a prophet with the proportions of a young man.' Here we see the conventionalism which was, I think, in some measure accountable for these unnatural canons of stature, the same conventionalism which rendered it necessary for certain characters to be played on the stage in certain conventional dresses, regardless of whether such dresses were correct or not. From this spirit of conventionalism, art has been by degrees emancipated, and as this has taken place, there has sprung up a greater desire for accuracy of details anatomical or otherwise.

I shall now proceed to examine in order the proportions of each part of the body, giving in connection with each what appears to me to be the best established opinion. I shall also mention the differences existing between the two sexes, and between various races, leaving the question of the changes due to growth and age to be dealt with in a subsequent section. In this part I shall take the measurements of Topinard as my standard of comparison, since they appear to me to be the most careful and complete.

Head.—The head was by the ancients generally considered to be contained eight times in the body, though this proportion is one which, as we have already had occasion to note, is frequently departed from. I give here a few figures, with the authority for each, and others appear in the more elaborate table of Topinard:

Statue.	*Heads.*	*Authority.*
Pythian Apollo	$8\frac{1}{2}$	Humphry.
Farnese Hercules	8	Quetelet.
Laocoon	$7\frac{2}{3}$	Duval.
Antinous	$7\frac{1}{2}$	*Ibid.*
Gladiator	8	*Ibid.*

Moreover, more modern artists have varied the canon con-

siderably; thus, in some of Michael Angelo's figures the size is equal to nine, or even to twelve heads, in order to communicate more grace to a stooping attitude (Humphry). Roberts errs in making it the seventh part of the whole height, though he also says that the proportion may vary between six and eight, and in the case of giants, nine times; while in dwarfs it may form a fourth part of the height.

Quetelet makes the male head 7·4, or very nearly seven and a half times included in the stature.

Topinard gives the following table showing the proportion of the head to the body, as expressed by various artists. The second column shows what this amounts to in numerical terms of the stature, the latter being taken as 100.

Canon.	*Heads.*	*Stature*=100
Hindoo	$6\frac{5}{6}$	14·6
Egyptian (two statues)	$7\frac{1}{2}$	13·2
Greek (mean of 11 statues varying from 7 to $8\frac{1}{4}$)	$7\frac{2}{3}$	13·0
Roman (Vitruvius)	8	12·5
Italian (Alberti)	$7\frac{1}{2}$	13·2
Prussian (Schadow)	$7\frac{1}{3}$	13 6
French (Cousin)	8	12·5
„ (Gerdy)	8	12·5

Having thus laid down the figures employed by various artists, and after tabulating a number of figures ascertained by anthropologists, he makes the following remarks upon the two sets: The canon of Vitruvius adopted by Gerdy and Cousin exists only in the imagination of the authors; the Greek canon is that of Europeans with small heads, and more particularly, perhaps, of those of Mediterranean races; the Hindoo canon, which relates to the yellow Dravidian races, is approximately correct; and, finally, the canon of Schadow, which was formed from fair races of tall stature with long and narrow faces, is also approximately correct. The European races have shorter heads, although amongst these are met with higher types, such as the Belgians. The yellow races have very notably higher heads. The negroes of Africa

are in this respect nearer the first, and the negroes of Oceania are nearer the second. Using the language of artists, and speaking of the large average, it may be said that the stature of Europeans is equal to seven and a half heads, that of negroes to seven, and that of typical yellow races to six and a half. This figure Topinard has expressed in his own canon, which I gave at a former period; he there makes the head 13·3 of the stature, an amount which is contained a trifle more (·25) than seven and a half times in the one hundred parts allotted to the stature. This also coincides with the canon of Marshall, in which the head is nine parts of a stature of sixty-seven, giving seven heads and four units, or very nearly seven and a half heads for the stature.

We may, I think, conclude that in representing the average European male this figure may be accepted as accurate. When the number of heads is decreased an appearance of heaviness and dwarfishness is imparted to the figure. When it is increased slightly it may give an appearance of greater gracefulness to the person, yet still without sacrifice of truth; but when it is carried to eight heads the boundary is passed. A good idea of the effect produced by altering the number of heads in the stature of a figure will be gained by examining the linear scheme of the Germanicus and Apoxyomenos (Fig. 3, p. 27), the former containing rather more than seven and a half heads, and the latter nearly eight and a half. Camper has given an example of the difference produced by adopting these two standards, by comparing the pictures of Watteau with those of Rubens. The figures of the former, having eight heads instead of seven, are more graceful than those of the latter, notwithstanding the wonderful power of execution and colouring exhibited by that great master. It should also be remembered that some of the great artists—and this specially applies to the sculptors—varied the proportions, and even totally falsified them, because of the peculiar circumstances under which their work was to be viewed. Thus, as I have already mentioned, Michael

Angelo made some of his stooping figures as much as twelve heads; and, as Topinard points out, if the head was to be seen from below and in perspective, being placed in an elevated situation, it was increased in size, and the body was made to contain it no more than six times. With regard to differences in proportion between the male and female head, there is some variety of opinion. Quetelet says that the male head is contained 7·4 times in the stature, and the female 7·2, thus the head in woman is somewhat longer proportionately than in man. Topinard also says that in general the head is higher in women than in men, and that this is probably the case in all races. On the contrary, Marshall makes his female figure contain exactly seven and a half heads, and his male seven and four-ninths, the former thus having proportionately a smaller head. The following relations between the different parts of the face are given by Quetelet, who says: 'We may remark an admirable harmony which exists between the principal parts of the human physiognomy. Each of its essential parts has an extremely simple relation with the neighbouring portion, and this harmony is so striking that it cannot escape the most superficial observation, even without the aid of measurements. Thus, artists have well recognised that in a regularly proportioned body the size of the eye is equal to the distance between the two eyes; it is also equal to the length of the nose. This proportion is so simple, and at the same time so constant, that it enters into the first notions of design. It has, perhaps, been less remarked that the ear, an organ apparently of little importance and of irregular form, remains at all ages exactly equal to the size of the two eyes. The measurement must be taken in the direction of the greatest size of the ear. This rule is subject to so few variations that in my tables the greatest differences in the averages do not amount to more than a millimetre; this regularity is still more remarkable since the ear is of all the organs of sense that which attracts usually the least attention. The size of the

ear is also half the distance from its opening to the summit of the head. A relationship not less curious is that which exists between the size of the eye and that of the mouth, the values being in the ratio of two to three. This relation is absolute at the period of puberty; the mouth is smaller in infancy on account of the fatness of the cheeks; it becomes a little larger at a more advanced age. These relationships can be pushed still further, and it will then be found that the eye is contained five times in that diameter of the head which is taken through the temples, and seven times in the antero-posterior diameter.'

Neck.—When we come to consider the measurements of the remaining portions of the axial part of the body, we are met with the difficulty that different observers have not always taken the same points for their observations, which makes any comparison of them exceedingly difficult. This is especially the case in connection with the measurements of the trunk proper, as we shall shortly have occasion to notice; but it is not less true of the neck. According to Quetelet, this is defined as being the area included between two parallel lines drawn, the one below the chin, the other above the point of junction of the clavicles. This is a trifle higher than the measurements which are taken, as in Topinard's work, to the suprasternal fossa, but so little so as to be negligable in the case of artists. Marshall makes the length of the neck in the male three units, or one-third of a head; and in the female three and a half units, or a little longer, the difference in proportional length being explained by him by the fact that in the female the sternum is placed at a lower level, the clavicles being thus also depressed internally, and the upper ribs have a greater obliquity. If we compare these measurements with Topinard's standard, which for the neck is 4·2 parts of one hundred, we find that, calculated in the same manner, Marshall's figure would amount to 4·4 for the male, or a little longer than that of the French author. Blanc, on the contrary, makes it one nose or one-fourth head in length, which is too short. The transverse measurement of the

neck in the male is four and a half units, or exactly one half head; in the female it is four units. The antero-posterior measurements in the two sexes are five units and four and a half units respectively; thus the female neck is proportionately more slender than that of the male.

Trunk.—There are three methods of considering the trunk as an object of measurement. The first of these is to take the measurements of the spinal column from the first dorsal vertebra to the termination. The second, which is strictly anatomical, is to disregard the clavicles and other portions of the shoulder-girdle above as belonging properly to the upper extremity, and to confine the measurements to the thoracic, abdominal, and pelvic cavities. The third, which is certainly the most useful from an artistic point of view, is to include the portion omitted in the second, and to measure the trunk as it appears to exist in the nude figure clothed with its skin and muscles. This is the system adopted by the French Society of Anthropologists, whose directions state that measurements are to be taken from the suprasternal notch to the seat, that is, to that portion of the body which rests upon the ground, or upon a chair, in the sitting posture. Topinard's conclusions drawn from measurements made in various ways are as follows: The relation of the trunk, considered as the vertebral column, varies within narrow limits, as Carus, who on this account took it as his standard of comparison, had already pointed out. At the same time differences do exist; thus, the Esquimaux and the Tasmanians, so far as the measured cases go, have a trunk shorter than the average; the Samoyedes, the Indo-Chinese, the Polynesians, and the South Americans, all yellow races, have one which is longer. The mean of 108 Europeans examined being 33·8, we may say, in order to assist the memory, that the average of humanity is 33·33, or one-third of the stature. The character seems to vary somewhat in different races; but amongst Europeans the female has proportionately a longer trunk. Finally summing up all the evidence which he has been able to obtain

from various sources, he concludes that in whatever manner measurements be taken, provided that similar observations be compared with one another, the trunk will be found to be longer in the yellow races, shorter in those of the negro type, and of intermediate length in white races, though exceptional cases are met with in each which are contrary to the rule. The female has a longer trunk, at least amongst European nations; and in individuals of lofty stature the trunk is longer. Turning now to Marshall's directions, it will be found that he agrees with Topinard in making the female trunk longer, and this for reasons which I have already detailed. His measurements are taken to a point one and a half units below the tuberosity of the ischium, which is the bony point on which the body rests in the sitting posture, and we must, therefore, subtract this figure from the twenty-seven units which he allows for the trunk and neck. We have seen that he allows three of these for the neck, thus four and a half must be deducted in all. If we reduce the figure of twenty-two and a half units thus obtained to the same terms as those employed by Topinard, we find that it comes out as 33·5, which is very nearly the figure given by the French author.

The intrinsic measurements of the trunk have also been dealt with by Marshall, and the following are his principal results. In the transverse direction the measurement from one deltoid prominence to the other—that is, the extreme breadth of the shoulders in the nude subject—is in the male two heads; that is exactly one-half of the length of the axis, that from one acromion process to the other, or the maximum breadth of the skeletal shoulders, being one unit less. In the female the deltoid measurement is seventeen units, or one unit less than two heads, and thus it is proportionately shorter than in the female. The distance between the nipples is one head in the male, one unit less —or eight units—in the female. The normal waist in both sexes is ten units, being thus one sixty-seventh of the stature more than a head. The width of the brim of the

pelvis is eleven units, and the measurement across the trochanters the same in the male, whilst in the female these two figures are twelve and a half and fourteen and a half units respectively. The following table gives three of the more important antero-posterior measurements in the male and female respectively:

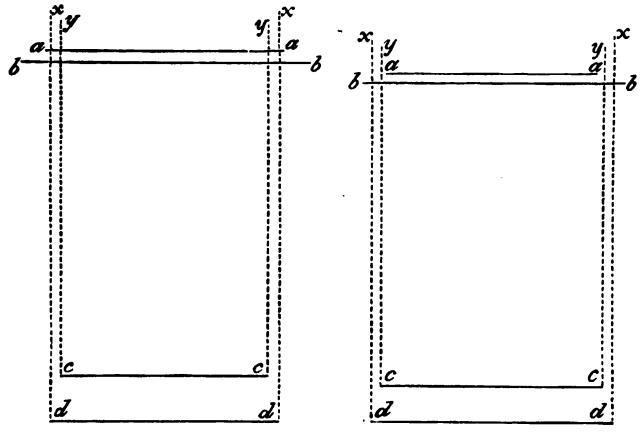
	Male.	*Female.*	
Level of nipples	$10\frac{1}{2}$	$9\frac{1}{2}$	units.
Waist	8	8	
Gluteal prominence	9	$10\frac{1}{2}$	

From these measurements it will be obvious that in the male the transverse and antero-posterior diameters are greater above—that is, in the region of the shoulders—than below, in the region of the hips; whilst in the female, though the superior are also greater, the difference is not so marked as in the male. On this important point Duval has the following remarks, which I think worthy of quotation. Comparing the diameter of the hips with that of the shoulders, he says: 'What strikes us most in this comparison, at the first glance at a series of skeletons, is the great projection which the hips form in the female. In order to express this, various formulæ have been proposed. They consist in considering the trunk as a figure more or less regularly oval, of which one extremity corresponds to the shoulders, the other to the hips, and in determining, according to the sex, which diameter exceeds the other. The ancients did not hesitate to express this formula in the following manner: In the male and in the female the trunk represents an ovoid—that is to say, an oval similar to that of a figure of an egg, having a greater and a lesser extremity; but in the male this has its greater extremity superior, while in the female the greater is inferior. Therefore in the female the diameter of the hips exceeds that of the shoulders, while in the male it is the diameter of the shoulders which exceeds that of the hips. This formula, as regards the female, is evidently exaggerated, as we see in a moment by comparing the actual figures. It seems, in fact, to Savage and Malgaigne, to be exaggerated, and

in their works on anatomy they propose substituting the following formula: Allowing that the trunk of the male is an ovoid, with the greater extremity superior, the trunk of the female forms an ellipse—that is to say, a figure in which both extremities are of the same dimensions; therefore in the male the diameter of the shoulders exceeds that of the hips, and in the female the diameter of the hips does not exceed that of the shoulders, but is only just equal to it. Now, this last formula also exaggerates the real proportions of the hips in the female. The correct formula is as follows: In the male, as well as in the female, the trunk represents an ovoid with the greater extremity superior; but while in man the difference between the greater extremity and the lesser is very considerable, in the female this difference is very slight. We shall see by figures that in the female the diameter of the hips, though always less, differs very little from that of the shoulders. In the male the distance from the head of one humerus to the corresponding part on the opposite side (inter-humeral diameter) is on the average 15¼ inches, and the measure taken from one great trochanter to the other (inter-trochanteric diameter) is 12¼ inches; therefore there is between the two diameters a difference of about one-fifth. In the female the inter-humeral diameter is on the average 14 inches, the inter-trochanteric diameter is 12½ inches; therefore there is between the two diameters a difference of only one-twelfth. These figures also serve to demonstrate that the diameter of the shoulders is much greater in the male than in the female (15 to 14), and that inversely the diameter of the hips is much greater in the female than in the male (12½ to 12¼); so that if a man and a woman of average stature are supposed to throw their shadow on the same portion of a screen, the shadow of the shoulders of the male would cover a much larger surface than the shadow of the shoulders of the female; and, on the contrary, the shadow of the hips of the woman would exceed the shadow of the hips of the man, but only to a very small extent.

'By the diameter of the hips we have in the preceding considerations understood the inter-trochanteric diameter. There is, however, a method of considering the subject which justifies to a certain extent the formulæ adopted by the authors previously mentioned. It consists in comparing on the skeleton in both sexes the diameter of the pelvis (the femora being removed) with the diameter of the shoulders (the humeri being removed). Then the shoulders are represented by the *inter-acromial diameter*, and the hips by the *inter-iliac* (from one iliac crest to the other). Under these circumstances the exact measurements show that in the male the inter-acromial diameter is twelve and three-quarter inches and the inter-iliac eleven inches; therefore, as in the preceding, the trunk, deprived of its members, still represents an ovoid, with its greater extremity superior. But we see that in the female, the inter-acromial diameter being eleven and a half inches, the inter-iliac increases to twelve inches, and therefore that here the trunk, deprived of its members, represents an ellipse or an ovoid, with its greater extremity inferior, the superior extremity differing very little in size from the inferior. But this mode of mensuration does not express the subject as it exists; for the artist does not consider the trunk as otherwise than complete—that is to say, provided with its superior and inferior members—and it is necessary to take into account the part which they take in the diameters of the trunk by the presence of their extremities (the head of the humerus and the great trochanter). We have thought fit, however, to show here this mode of mensuration, for it explains clearly the greater diameter of the pelvis in the female compared with that of the male. If we arrange in a table the figures given in the preceding for the inter-humeral, inter-trochanteric, inter-acromial, and inter-iliac diameters in the male and in the female, or if, better still, we represent those figures by proportionate lines intended to express, on the profile of a man and that of a woman, the proportionate value of the diameters of the pelvis and the hips, and if we cause vertical lines to pass

through the extremities of the inter-iliac and inter-trochanteric diameters, we obtain two figures which express in a striking manner all that has been pointed out (Figs. 6 and 7). We see, in fact, that in the male subject (Fig. 6) the vertical lines (y, y) passing through the extremities of the inter-trochanteric (d, d) and the inter-iliac (c, c) diameters, both fall within the extremity of the inter-humeral diameter (68), and also the inter-acromial (a, a). On the contrary, in the female (Fig. 7) we find that these same vertical lines both fall within the extremities of the



FIGS. 6 AND 7.—Diagrams comparing the diameters of the hips with the diameters of the shoulders in the male (Fig. 6) and in the female (Fig. 7).

inter-humeral diameter, but on the outer side of the inter-acromial.'

The following table will supply accurate information on this point, and show the exact relations of the parts in the two sexes:

Relation of the maximum size of the hips to that of the shoulders = 100

100 male Parisians - - - -	83·0
30 female Parisians - - - -	91·8
30 male Belgians - - - -	82·5
30 female Belgians - - - -	94·5

Before leaving the subject of the trunk, there are certain points of some interest to artists which may well be disposed of in this connection, and the first of these is the

position of the umbilicus. According to Vitruvius, as we have already seen, this was placed at the central point of the body, so that if a man were laid on his back with the arms and legs extended a circle might be described around them, having the umbilicus as its centre. This statement is incorrect, save for one period, and that an early one of life—that is, at two years of age. The central point of the body is, according to Roberts, at the time of birth, when the child is about the sixth of the height it will ultimately attain to, a little above the umbilicus; at two years it is at the umbilicus; at three years, when the child has attained half its total height, the central point is on a line with the upper borders of the iliac bones; at ten years of age, when the child has attained three-quarters of its total height, the central point is on a line with the trochanters; at thirteen years it is at the pubes, and in the adult man it is nearly half an inch lower. In the adult woman the central point is a little above the pubes. Topinard gives the following table, which shows the position of the umbilicus according to various artists and anthropologists. The stature is considered as 100, and the figures show the proportion of that amount between the ground and the umbilicus:

Greek sculptors	60·7
Alberti	60·0
Schadow	60·9
Gerdy	62·5
10 Belgians, 25 years old (Quetelet)	60·4
100 Parisians (A. Bertillon)	58 9

The position of the centre of gravity also differs slightly in the two sexes. The line of gravity passes through the occipital condyles, the middle of the sacrum, the head of the femur, the patella, and the arch of the foot; it is thus a little in front of the knee, and a great deal in front of the ankle. The centre of gravity in the male is three and a half units above the upper border of the acetabulum—that is to say, thirty-nine and a half units above the ground. In the female the centre of gravity is four units above the upper border of the acetabulum.

Upper Extremity.—There are several methods of arriving at the measurements of the upper extremity, which may be divided into direct and indirect. The former are three in number. The first is to measure from the acromion to the extremity of the middle finger, the arm being extended,

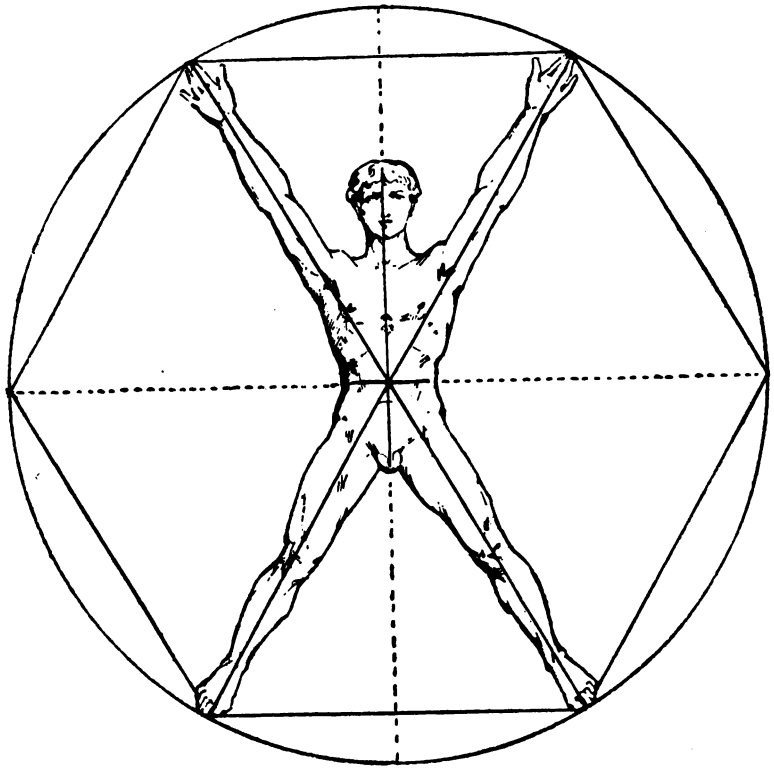


FIG. 8.—The human figure described within a circle.

by which means, however, the length arrived at is somewhat too short, since the head of the humerus, which lies in the axilla, is not fully taken into account. The second is to add together the measurements of the various segments of which the extremity is composed. This also gives a somewhat false figure, since the limb in a natural condition is not extended in a perfectly straight line, the arm and forearm meeting at an obtuse angle at the elbow.

The third is to measure from the acromion to the extremity of the middle finger when the arm is lying by the side of the body. The two indirect methods are, firstly, to ascertain the distance between the extremity of the middle finger and the superior border of the patella when the arms are lying straight by the side, as in the military position known as 'attention.' The second method is to measure the full span of the two arms when fully extended from the shoulders—a method to which I shall have shortly to return.

The length of the whole upper extremity in the male is, according to Marshall, twenty-nine and a half units, and in the female twenty-nine. The following table will show the division of these figures between the different segments of the limb:

	Male.	*Female.*
Humerus - - - -	13 units	12½ units
Radius - - - -	9 „	9 „
Hand - - - - -	7½ „	7½ „
	29½	29

Reducing the figure in the male to terms of the stature, the latter being considered as 100, so as to compare the result with that given by Topinard, we find that the proportion is forty-four, whilst that of the French author is forty-five. The differences in the points of measurement adopted by the two authors may account for this discrepancy, which is in any case not very large. With regard to the relation of the limb to other parts of the body, it may first be mentioned that, according to Marshall, the top of the shoulder-joint is thirteen units below the vertex. It must not, however, be forgotten that this is a figure which may vary within certain limits in persons of the same stature and possessing limbs of the same length, according to whether they are square-shouldered or round-shouldered, to use the common phrases. The position of the middle finger, with regard to the trunk, in the position of 'attention' is also one of importance. In the European of average height it corresponds usually to the middle of

the thigh; in subjects of short stature the extremity of the hand descends a little lower than the middle, and in very tall men it is a little higher. In the yellow and black races the extremity of the middle finger descends considerably lower than the middle of the thigh. It is interesting to note that in the highest apes the position of the same point gradually descends still farther. Thus in the chimpanzee it is placed below the knee; in the gorilla it corresponds to the middle of the leg; whilst, finally, in the orang-utang and in the gibbon it nearly reaches to the ankle. The facts respecting the position of the middle finger in different races are also brought out by the following table, which give the distance between its point and the centre of the patella in figures relative to the stature (=100):

1,061 sailors (white)	8·73
10,875 American soldiers	7·49
517 Iroquois Indians	5·36
2,020 negroes	4·37

Turning now to the intrinsic measurements of the upper limb, we may first consider the relation between the arm and the forearm, a subject which has received considerable attention, what is known as the antibrachial index being founded on the measurements of the two parts when compared with one another. In the first place, in the adult condition, the forearm of the negro is much longer in comparison with the arm than that of the European. The measurements, for example, of five Congo negroes gave an average of 93·4, the arm being considered as 100, whilst the measurements of thirty Germans gave 83·5 to 100 as the proportion between the same two parts. Amongst white and yellow races, however, there is no special rule to differentiate one from another by the comparison of the segments of the limb. The relation of the hand to the body stature is a matter of considerable interest to artists, since it has been taken as the canon by several writers. Respecting the racial variations of this part, Topinard says that, speaking generally, Europeans have the smallest hands, with the exceptions of the true gipsies (Tziganes),

who have still smaller. The largest hands are met with amongst the yellow races, whilst the negroes hold a middle place in this respect. The following table will give an idea of the manner in which the hand has been used as a canon, the figures being the number of times which it was included in the stature:

Greek artists (Topinard)	10·9
Vitruvius	10·0
Dürer	10·0
Cousin	9·3
Duval	10·0
Roberts	9·0
Quetelet	9·0
Marshall	8·93
Topinard	8·69

From this table it will be noticed that artists in general, and those of antiquity in particular, have made the hand too small in proportion to the stature. It should, however, be mentioned that Duval says that his figure is subject to great variations. Taking all the figures into consideration, we may say that the hand is contained nine times in the stature of the average European.

The full span of the arms when extended at right angles from the trunk is another measurement which has attracted the attention of artists; it is the *grande envergure* of the French. We have already noticed Vitruvius's statement that the span was equal to the stature, and that this is accepted as accurate in the canon of the French studios as given by Topinard. Duval says respecting this matter: 'The relation of the span of the upper limbs to the height has been expressed long since by the formula known as the square figure of the ancients. If we cause two horizontal lines to pass, one at a tangent to the soles of the feet, the other at a tangent to the summit of the head, and two vertical lines at right angles to the extremities of the two arms extended horizontally, these four lines form by their junction a perfect square; in other words, the man having the arms horizontal is enclosed within a square. This shows that the span of the arms is equal to the height. This statement is correct for a man of the Caucasian race

of the middle height; but it is not so for the yellow and black races, in whom the span of the arm is greater than the height. If from man we pass on to the superior monkeys called anthropoid (chimpanzee, gorilla, etc.), we find that the span of the arms in these becomes more and more extended as compared with the height until it becomes almost double. Thus, in the gorilla, the height being 5 feet 7¼ inches, the span becomes 8 feet 9¼ inches; and in the chimpanzee, to a height of 5 feet 5¼ inches, the

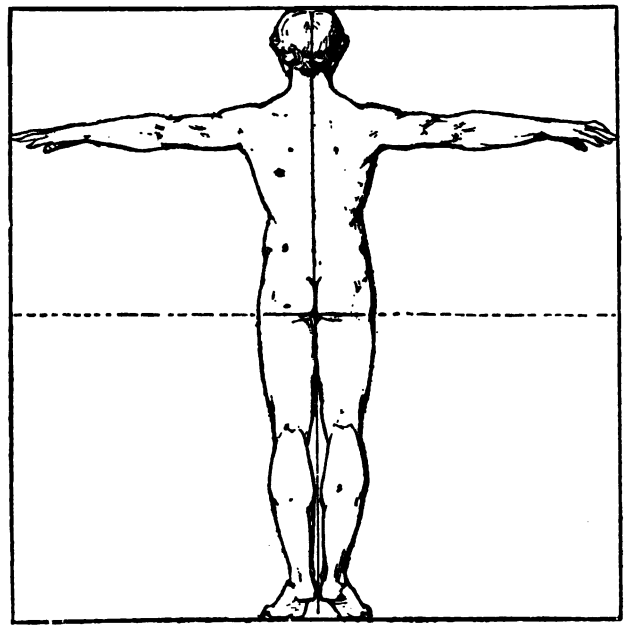


FIG. 9.—The human figure inscribed within a square.

corresponding span is 6 feet 6 inches.' The statement, however, that the span equals the stature is not absolutely correct, for the relation between the two, though very variable, is in favour of the span as compared with the height.

Roberts states that the theory which holds that the span is equal to the height is true only within certain limits, namely, from the time of birth to that of puberty, a state-

ment which is true of both sexes. After puberty more decided changes in the proportions take place, the horizontal being greater than the perpendicular measurement, especially in men, whose chest and shoulders have a greater development in breadth than women. The ratio of height to the measurement of the extended arms is in the adult man as 1 to 1·045, and in women as 1 to 1·015. Duval notes certain relationships between parts of the upper extremity, which may conveniently be given here in the form of a table:

The length of the hand, less the third phalanx of the middle finger, is equal to:

the clavicle,
the vertebral border of the scapula,
the manubrium and gladiolus sterni, taken together,
the distance between the scapulæ when the hands are hanging by the sides,
half the length of the humerus,
two-thirds of the length of the forearm.

But, as he remarks, these proportions are so variable that they cannot be insisted upon.

Lower Extremity.— The difficulties of measuring this limb are even greater than those attaching to the upper, since the head of the femur is buried in the acetabulum and covered over by a mass of muscles, which render its identification extremely difficult. The following table shows the proportions of the various parts according to Marshall:

	Male.	*Female.*
Femur	18 units	18 units
Tibia	14 „	14 „
Foot, from lower border of tibia to end of second toe	9 „	8 „
	41	40

From this it appears that the lower extremity in the female is proportionately one unit smaller than in the male, and that this difference is found altogether in the foot.

Another useful series of figures, readily to be remem-

bered also, are those relating to the position of different joints from the vertex, which are:

	Male.	*Female.*
Shoulder	1 head 4 units	1 head 4½ units
Hip	3 „ 4 „	3 „ 5 „
Knee	5 „ 4 „	3 „ 5 „
Sole of foot	7 „ 4 „	7 „ 4½ „

The following antero-posterior measurements are also worthy of notice:

	Male.	*Female.*
Knee	4½ units	5 units
Calf	5 „	4½ „
Foot	10½ „	9½ „

From the difference in the points from which measurements are taken it is difficult to compare Topinard's measurements with these, save in the case of the foot. According to the latter author, this forms 15 parts, the stature being represented as 100. Marshall's proportion, reduced to the same terms for the male, comes to 15·6, for the female to 14·17, and the average between the two to almost 15. The difference between the figures may, of course, be racial.

The measurement of the foot, like that of the hand, is of peculiar interest to artists, since it has also been used as a canon of stature. The following table shows the number of times which the foot is included in the stature according to various authorities:

Greeks	6·44
Vitruvius	5·9
Alberti	6·5
Dürer	6·0
Schadow	6·6
Quetelet (male)	6·75
„ (female)	6·25
Duval	6·33
Marshall	6·38
Topinard	6·6

The remarks of some of the authors on this point are of interest. Roberts says that at all ages of life and in both sexes it forms from the 0·15 to 0·16 of the total height of the individual; it is, however, comparatively a little longer

at the period of adolescence, but rather shorter in children and adults. Taking the length of the foot for unity, the total height of man would be six and three-fourths, and of women six and one-fourth. It is generally believed that the length of the foot is equal to the height of the head; but this is only true of the age of ten years; before that period the head is longer, and after it shorter, than the foot. Duval notes the interesting point that the length of the foot being considered as six and one-third times contained in the stature, as he believes to be correct, if one-third of the foot be taken as a canon, it will be found to be contained nineteen times in the stature. But the number nineteen is the same as that which, according to Blanc, in the Egyptian canon expresses the proportion which the middle finger bears to the height.

Quetelet, from whom the remarks quoted above by Roberts are taken, also says: 'It is in drawing the foot that mistakes are most frequently made; in fact, it is so customary to make it too small that the proportion is falsified in all designs where the artist has preferred to please the public rather than to express the truth. Often, in fact, in fashion plates the foot is not represented one-half its correct size. We may say that there is scarcely any human measurement which is more frequently altered; there is a species of foolishness which prevents nature from producing the exact size of this member, and substitutes for it another, which at the same time destroys the harmony of the body and the firmness of its support. The Chinese have even carried these exaggerated tastes to such a pitch that their most distinguished women blush if they know how to walk. It appears that this faculty should only belong to servants.' The same author mentions that, speaking generally and starting from the age of puberty, the height of the head forms a proportional arithmetical mean between the length of the hand and that of the foot. Examining this by Topinard's figures, which give for the foot 15·0, for the head 13·3, and for the hand 11·5 respectively, we find that the statement is approximately correct.

Quetelet also notes that, according to a well-established belief, the length of the foot is equal to the circumference of the fist, so that we often see drapers wrap the foot of a stocking round the fist in order to avoid the trouble of direct measurement of the hand. This belief, he thinks, is fairly established by his tables, although Roberts does not consider that there is much foundation for it.

Duval endeavours to establish some easy relations between the parts of the lower limb, and says that here, as in the case of the hand, we cannot make the foot a common measure for the interior extremity. It is easy, he says, to perceive upon the skeleton that the distance from the superior extremity of the head of the femur to the inferior border of the internal condyle is equal to two feet; but this has no practical value; it cannot be used on the living body, as it is difficult to recognise the level of the superior part of the femur. If, instead of the head of this bone, we take the superior border of the great trochanter (a part easily felt beneath the skin), we find that the length from that point to the inferior border of the external condyle scarcely ever measures two lengths of the foot; in fact, the great trochanter is upon a considerably lower level than the head of the femur. The leg, including the thickness of the foot, does not contain the length of the foot an even number of times; in fact, the distance from the inferior border of the internal condyle of the femur to the ground (or the sole of the foot) is not equal to twice the length of the foot; but it is interesting to observe in general that the length of the leg, plus the thickness of the foot, is equal to the distance from the great trochanter to the inferior border of the external condyle; therefore, the middle of the lower limb (starting from the great trochanter) corresponds exactly to the line of the knee. When we compare the length of the foot with the leg, beginning from below upwards, we find a regular proportion and one of practical interest, viz., that from the ground to the middle of the patella usually measures twice the length of the foot.

I have now concluded that portion of my lectures which deals with the proportions of the adult human body, and before passing to the final section, in which I shall give some notes as to the growth of the body and its constituent parts, I think it well to make one remark. I have throughout that portion of my remarks which I am now concluding contrasted Marshall's canon of proportion with the careful figures given by Topinard, and the reader can scarcely have failed to notice that the two correspond in a very remarkable and uniform manner. Now, Marshall's rule was devised for artists; it was intended to meet their requirements, and, so far as I am aware, though here I speak under correction, it is well fitted to do so. It is satisfactory to find that his conclusions are so well grounded and so corroborated by the scientific figures, so that in using his rule, use is made of one which is scientifically accurate, as well as artistically useful. I have now to turn to the consideration of the method of increase of the human body and of its various parts, a portion of my subject which I trust will not be without usefulness and interest.

It will be noticed that the proportions of the infant when first it makes its appearance in the world are very different from those which it has when it arrives at the period of adult existence, and that between these two epochs the proportions are constantly altering, one part of the body chiefly increasing at one time and a second at another. It will also be noticed that the proportion in two sexes, which, as we have seen, are in many instances different in the adult, for some time remain the same during childhood, and that on arriving at a certain age they commence to take on their adult characters and to differentiate from one another.

The facts stated in this section are chiefly from the works of Roberts and Quetelet; having made which acknowledgment, I need not refer more particularly to the author of any individual statement.

As regards height, at the time of birth there is but little

difference between the stature of the male and female infant, the average for the former being 19·34 inches, and for the latter 18·98 inches. Thus, the actual longitudinal proportions almost coincide, whilst the relative ones absolutely do so. Between the fourth and the ninth years the relations remain much the same, but towards the thirteenth year the female gets in front of the male, and is larger and heavier. After this period the growth of the male becomes more rapid; he soon passes the female, and eventually the adult differences between the sexes are established. The difference between the sexes in respect to height are due to several causes. In the first place, as noticed above, the female is a little smaller at birth. In the second place, after the thirteenth or fourteenth year the growth of the female is considerably feebler than that of the male, and finally the growth of the former is concluded about two years before that of the latter. The last of these causes is the most potent in determining the difference in stature, for the initial difference is abolished, or indeed reversed, at the thirteenth year; but at the period when growth is terminated there is an average advantage in stature of males over females of four inches.

Taking the head, this portion of the body is contained three times in the axis at the time of birth, a proportion which is maintained until the fourth year; at the ninth year the axis is three and a quarter times as long as the head, at the fifteenth three and three-quarters, and at the twenty-fifth four times. In relation to the stature, the head is at birth contained four times in the body-length. But we have already seen that in the adult it is contained seven and a half times, from which facts it follows that the head grows only half as rapidly (nearly) as the remainder of the body. As a matter of fact, it doubles its height between the time of birth and that of adult life. This increase is, however, not evenly distributed over the whole head, since the lower part grows more than the upper. This is shown by the fact that the lower part of the nose,

which in the adult divides the face into two equal parts, is in the infant placed much nearer to the chin.

The neck, which is short at birth, apparently becomes shorter during the first few years of life; this apparent decrease in size is due to the accumulation of fat at the chin of the infant.

The torso triples in length and in width. The relations of its antero-posterior diameters in the infant and in the

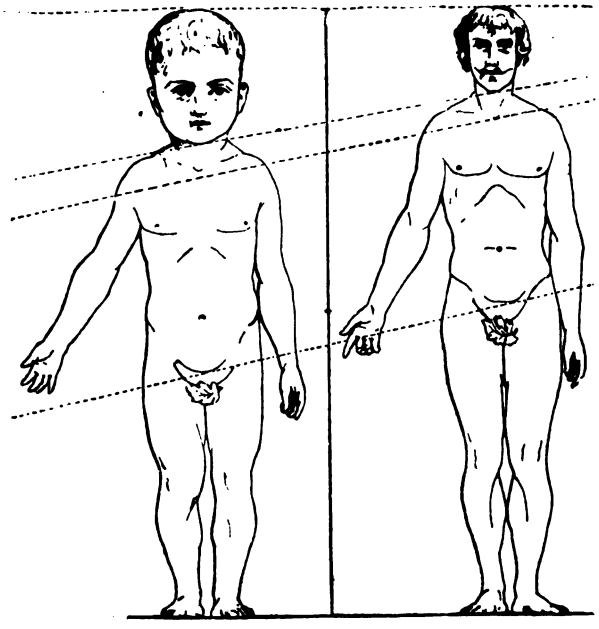


FIG. 10.—A comparative representation of the infantile and adult figures, both being shown as of the same height. The relation between the various parts of the body and of the limbs is shown by the dotted lines. Convergence of the line towards the side of the adult shows proportional diminution of size, and divergence increase, or, in other words, less or greater increase of size during the time of growth (Langer).

adult are as 1 to 2·36; thus, increase in this direction is not as great as in the other two. Quetelet has shown by the employment of two triangles that the increase in size of the torso, like that of the head, is not the same in all its

parts. If we construct a triangle having its base situated at a line drawn between the two nipples and its apex at the suprasternal notch, it will be found that the two sides are less in their respective measurements than the base. After the first year this difference is twenty-one millimetres, and this difference is maintained almost exactly throughout the period of development; thus, the growth of this portion is proportionately even. The proportions between the base in the infant and the adult are as 1 is to 2·81, and those of the sides at the same epochs as 1 to 3·41. The height of the

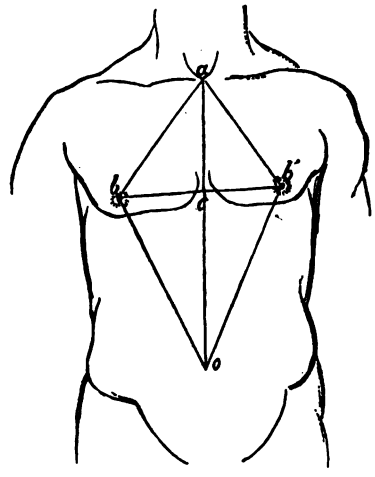


FIG. 11.—Triangles showing growth of thorax and upper part of abdomen (Quetelet).

triangle in the infant is to that of the adult as 1 to 3·78, so that, as we have seen that the whole torso triples during growth, the increase of this part is more rapid than that of the whole. If now the length from the base of this triangle to the umbilicus be taken, and the differences between the child and the adult represented proportionately, it will be found that they are as 1 to 2·42, or less than the general growth of the torso. From these figures we may conclude that the portion between the nipples and the upper part of the thorax grows more rapidly than that between the first-

named points and the umbilicus. I am now assuming that Quetelet's figures are correct on this point, and should mention that he expressly states that they apply only to the male sex, since this part of the body is subjected to so much artificial treatment in the female that it is not possible to come to accurate conclusions respecting it.

The upper extremity, with the hand included, is three and a half times longer in the adult than in the infant. The hand, however, grows more slowly than the remaining parts, doubling between the fifth and seventh years, and tripling between this date and the termination of development. If the arm be considered without the hand, it doubles between four and five, triples between thirteen and fourteen, and is four times the infant size at the termination of growth. The forearm grows more than the arm proportionately, the proportion between the former in the child and adult being as 1 to 4·26, and of the latter as 1 to 3·78. The circumferences at the biceps and elbow increase two and three-quarter times nearly.

The lower extremities, measured from the fork to the sole of the foot, double their length before the third year; at twelve years they are four times, and at twenty years five times, their original length. These are Quetelet's figures. According to Marshall, the whole lower extremity increases four and a half times during the process of development. The various segments do not increase at the same rate, for the thigh grows more rapidly than the leg, and the leg than the foot. Thus there is this difference between the growth of the upper and the lower extremities: that the greatest amount of growth in the former takes place in the middle segment, whilst in the latter it is in the segment which is nearest to the trunk. It will also be remarked that the lower extremity increases proportionately to a greater extent than either the stature, the torso, or the upper extremity. Turning now more particularly to the growth of the various segments of the lower limb, the thigh in the adult is 7·31 times the length of the same part in the child. Thus the increase in this part is far in excess of

that of any other part of the body. The leg, measured from the lower edge of the patella, increases four and a half times, the height of the foot three and a quarter times, and its length three and a half times.

As I have had occasion at an earlier part of this lecture to call your attention to the differences between the proportions of the arm and the forearm in the European and the negro, I think that the following remarks on that subject in connection with the rate of increase with which I have just been dealing may not be without interest to you. 'With regard to the proportions of the different segments of the extremities,' says Humphry, 'in the earliest periods the arm and thigh are respectively shorter than the forearm and leg, and the latter are respectively shorter than the hand and foot. During development and growth these proportions gradually become reversed; but the final relations between the several segments are not established until after puberty. At birth the arm, leg, and foot are of about equal length, and the hand is a little longer than the forearm. These facts are interesting as showing clearly that in its earlier conditions the most perfect human form presents more numerous approximations to the type of the negro, and likewise to that of the quadrumanous animal, than at subsequent periods. They show, also, that it is during the work of development and growth that the lower extremities attain their greater relative dimensions, and that the proximal segments of both upper and lower extremities come to bear that large proportion to their distal parts whereby the European type is characterized. Thus the difference in type between the negro and the European is reduced to a mere matter of growth, and it is shown that, so far as the extremities are concerned, a transient condition of the one corresponds with a permanent condition of the other. The same remark applies also to the dimensions of the trunk. Till the period of puberty the European and the negro more nearly correspond. It is not till after that period that the greater proportionate breadth of chest and pelvis is attained in the former.'

I must in conclusion say a very few words as to the influence of occupation upon the proportions of man. This, however, is a matter upon which much further work will be necessary before it is possible to draw any conclusions of real value. Everyone is aware that occupation, or at least certain occupations, produce a very marked effect upon the person and the physiognomy, but exactly in what this difference anatomically consists is not always so easy to say. The same remarks may be made respecting the influence of the general environment upon the stature—a subject on which Quetelet, from observations made upon dwellers in the cities and country parts of Belgium, remarks that the average stature in the towns is very much the same as that of the country people, though the former have a slight advantage in point of height. Speaking on this point, Topinard says: 'Have mountaineers longer or shorter legs? Both opinions have been maintained, but theoretically. Do some professions lengthen the parts employed and atrophy those disused? Everybody says so, but there are no direct proofs.' The most important document which was at Topinard's disposal in this matter is a comparison between soldiers, sailors, and students in America, which I give in a tabular form:

	10,876 soldiers.	1,061 sailors.	291 students.
Vertex to seventh cervical vertebra	14·81	15·28	14·82
Seventh cerv. vert. to perineum -	38·93	37·22	38·34
Perineum to knee - - - -	18·55	19·48	18·59
Perineum to ground - - -	27·71	28·02	28·25
Acromion to elbow - - -	20·25	19·95	20·14
Elbow to end of middle finger -	23·16	23·28	22·47

Each of these figures is referable to the stature, which is considered as 100. From the table it follows that the sailors have, in relation to the soldiers, a shorter trunk, longer portions of the lower extremity, a shorter arm, and a slightly larger forearm. Amongst the students, in comparison with the soldiers, the trunk, the leg, and the

forearm are a little shorter. What can be deduced from these facts? Is it the influence of occupation which ought to be invoked? In the case of the sailors, undoubtedly so. But amongst the students there is another factor to be considered, that of age, for their average age was only about twenty years, that of the soldiers being thirty-five.

INDEX.

THE END.

Baillière, Tindall & Cox, 20 and 21, King William Street, Strand.

A

CATALOGUE OF THE PUBLICATIONS

OF

BAILLIÈRE, TINDALL, & COX,

IN

MEDICINE, SCIENCE AND ART.

CONTENTS.

LONDON:

20, 21, KING WILLIAM STREET, STRAND.

[PARIS AND MADRID.]

1892.

*** Baillière, Tindall and Cox have special facilities for the disposal of authors' works in the United States and abroad; being in almost daily communication with the principal houses and agents.

Baillière, Tindall, and Cox's Books.

AIDS TO THE CLASSICS.

TEXT, TRANSLATION AND COPIOUS NOTES, together with an account of the Author and his works.

Ovid. Metamorphoses. Lib. I. Price 2s.
Cicero. Oratio Prima in L. Catilinam. Price 1s.
Cicero. De Amicitia. Price 2s.
Sallust. De Catilinæ Conjuratione. Price 1s. 6d.
Cæsar. De Bello Gallico. Lib. V. and VI. Price 2s.

TEXT AND NOTES.

Cæsar. De Bello Gallico. Lib. I. Price 1s.
Cæsar. De Bello Gallico. Lib. II. Price 1s.
Cæsar. De Bello Gallico. Lib. VII. Price 1s. 6d.
Horace. Carminum. Book III. Price 1s. 6d.
Horace. Carminum. Book IV. Price 1s.
Livy. Book XXII. Price 1s. 6d.
Ovid. Epistolæ ex Ponto. Lib. I. Price 1s.
Ovid. Tristia. Lib. I. Price 1s. 6d.
Ovid. Metamorphosoen. Lib. II. Price 1s.
Ovid. Metamorphosoen. Lib. XI. Price 1s. 6d.
Cicero. Pro Lege Manilia. Price 1s. 6d.
Cicero. De Senectute. Price 1s.

TRANSLATIONS IN LITERAL ENGLISH.

Cæsar. Gallic War. Book I. Price 1s.
Cæsar. Gallic War. Book II. Price 1s.
Cæsar. Gallic War. Book VII. Price 1s.
Horace. Odes. Books III. and IV. (together). Price 1s.
Ovid. Metamorphoses. Book II. Price 1s.
Ovid. Metamorphoses. Book XI. Price 1s.
Ovid. Pontic Epistles. Book I. Price 1s.
Ovid. Tristia. Book I. Price 1s.
Ovid. Tristia. Book III. Price 1s.
Livy. Book XXII. Price 1s. 6d.
Cicero. Pro Lege Manilia. Price 1s.
Cicero. De Senectute. Price 1s.
Virgil. Æneid. Book I. Price 6d.
Virgil. Æneid. Book V. Price 6d.
Virgil. Æneid. Book XII. Price 9d.
Virgil. Georgics Book II. Price 6d.

ALPHABETICAL INDEX OF AUTHORS.

AN

ALPHABETICAL INDEX OF WORKS,

IN

MEDICINE, SURGERY, SCIENCE AND ART,

PUBLISHED BY

BAILLIÈRE, TINDALL, & COX.

Abdominal Surgery. Colotomy, Inguinal, Lumbar or Transverse; for Cancer or Stricture with Ulceration of the large Intestine. By HERBERT W. ALLINGHAM, F.R.C.S., Surgeon to the Great Northern Hospital, Assistant Surgeon to St. Mark's Hospital for Diseases of the Rectum, Surgical Registrar to St. George's Hospital. With six plates and numerous illustrations. Price 6s.

Abdominal Surgery. The Surgical Diseases and Injuries of the Stomach and Intestines. By F. BOWREMAN JESSETT, F.R.C.S. Eng., Surgeon to the Cancer Hospital. Copiously illustrated. Price 7s. 6d.

Africa. A Contribution to the Medical History of our West African Campaigns. By Surgeon-Major ALBERT A. GORE, M.D., Sanitary Officer on the Staff. Price 10s. 6d.

Africa. Life on the Gold Coast. A Description of the Inhabitants, their Modes and Habits of Life; Hints to Travellers and others in Western Africa. By Surgeon-General GORDON, M.D., C.B., Hon. Physician to the Queen. Price 2s. 6d.

Alcohol, in some Clinical Aspects: A Remedy, a Poison. By GODWIN TIMMS, M.D., M.R.C.P. Lond., Senior Physician to the North London Consumption Hospital. Price 1s.

Alcoholism and its Treatment. By JOSEPH FRANCIS USSHER, M.D., L.A.H. Dub. [*In the Press.*

Ambulance Work. Questions and Answers on "First Aid to the Injured." By JOHN W. MARTIN, M.D., and JOHN MARTIN, F.R.C.S. Seventeenth thousand. Price 1s. net.

Anæsthetics. The Dangers of Chloroform and the Safety and Efficiency of Ether in Surgical Operations. By JOHN MORGAN, M.D., F.R.C.S. Second thousand, price 2s.

Anæsthetics. Selected Methods in the Administration of Nitrous Oxide and Ether. By FREDERIC HEWITT, M.A., M.D. Cantab., Lecturer on Anæsthetics at the London Hospital. Price 2s. 6d.

Anæsthetics: Ancient and Modern. Their Physiological Action, Therapeutic Use, and Mode of Action. By GEORGE FOY, F.R.C.S., Surgeon to the Richmond Hospital. Price 3s. 6d. net.

Anatomography; or, Graphic Anatomy. A new method of grasping and committing to memory the most difficult points required of the student. By W. DARLING, M.D., F.R.C.S. Eng., Professor of Anatomy in the University of New York. Price 1s.

Anatomy. Aids to Anatomy. By GEORGE BROWN, M.R.C.S., Gold Medallist, Charing Cross Hosp. Price 1s. 6d. cloth, 1s. sewn.

Anatomy. Text-Book of Naked-Eye Anatomy. With 113 Steel Plates, designed under the direction of Professor MASSE. Text by JAS. CANTLIE, M.B., C.M. (Honours), F.R.C.S., Charing Cros Hospital. Third edition. Plain, 25s., coloured, 50s., half calf.

Anatomy. The Essentials of Anatomy. A Text-book for Students and a book of easy reference to the Practitioner. By W. DARLING, M.D., F.R.C.S., and A. L. RANNEY, M.D. 12s. 6d.

Anatomy. The Pocket Gray, or Anatomist's Vade-Mecum. Compiled from the works of Gray, Ellis, Holden, and Leonard. By E. COTTERELL, L.R.C.P., M.R.C.S. Enlarged edition, 3s. 6d.

"A marvellous amount of information condensed into a remarkably small space."—*Med. Press.*

Anatomy. The Pocket Anatomist. By H. LEONARD, M.D. Enlarged Edition, illustrated. Price 3s. 6d.

Anatomy. Schematic Anatomy; or Diagrams, Tables and Notes treating of the Association and Systematic arrangement of Structural Details of Human Anatomy. By WILLIAM P. MEARS, M.B., Professor and Examiner in Anatomy at the University of Durham. Profusely illustrated. Price 7s. 6d.

Anatomy. Anatomy of the Child. With 14 coloured plates and 33 woodcuts. By JOHNSON SYMINGTON, M.D., F.R.S.E., F.R.C.S.E., Lecturer on Anatomy, Edinburgh. Price 42s.

Anatomy of the Inguinal and Femoral Regions in Relation to Hernia. By E. LEDWICH, Lecturer on Anatomy in the Ledwich School of Medicine, Dublin. Price 3s.

Anatomy. Human Anatomy and Physiology, illustrated by a series of Movable Atlasses of the Human Body, showing the relative positions of the several parts, by means of Superposed Coloured Plates, from the designs of Prof. G. J. WITKOWSKI, M.D. Each part complete in itself.

Part I.—Neck and Trunk. With Text Descriptive and Explanatory of the physiology and functions of the several parts. By ROBERT HUNTER SEMPLE, M.D., F.R.C.P. Lond. Price 7s. 6d.

The same enlarged to Life Size. Price £2 2s.

Part II.—Throat and Tongue, showing the Mechanism of Voice, Speech, and Taste. Text by LENNOX BROWNE, F.R.C.S. Ed. Price 7s. 6d.

Part III.—The Female Organs of Generation and Reproduction. Text by JAMES PALFREY, M.D., M.R.C.P. Lond., late Senior Obstetric Physician, London Hospital. Price 7s. 6d.

Part IV.—The Eye and the Apparatus of Vision. Text by HENRY POWER, F.R.C.S., Senior Ophthalmic Surgeon to St. Bartholomew's Hospital. Price 7s. 6d.

Part V.—The Ear and Teeth. The Mechanism of Hearing, and of Mastication. Text of the Ear by LENNOX BROWNE, F.R.C.S.E. The Teeth by H. SEWILL, M.R.C.S. Price 7s. 6d.

Part VI.—The Brain and Skull. (Cerebrum, Cerebellum, and Medulla Oblongata.) Text by T. STRETCH DOWSE, M.D., F.R.C.P. Ed. Price 7s. 6d.

Part VII.—The Male Organs of Generation. Text by D. CAMPBELL BLACK, M.D., Physician to the Glasgow Royal Infirmary. Price 7s. 6d.

Part VIII.—The Skeleton and its Articulations, showing the Bones and Ligaments of the Human Body and Limbs. Text by A. T. NORTON, F.R.C.S. Price 7s. 6d.

Part IX.—The Hand; its Bones, Muscles and Attachments. Text by JAS. CANTLIE, M.B., F.R.C.S. Price 7s. 6d.

Part X.—The Foot; its Bones, Muscles and Attachments. Text by STANLEY BOYD, M.B., B.S. Lond., F.R.C.S., Assistant Surgeon, Charing Cross Hospital. Price 7s. 6d.

Part XI.—Progress of Gestation. A Synopsis of Practical Obstetrics. Text by R. MILNE MURRAY, F.R.C.P. Edin., M.B. Edin. Price 7s. 6d.

The Set of Eleven Parts, complete in cloth-covered Box, with lock and key, £4 net.

*** No such simple, reliable, and comprehensive method of learning the several parts, positions, and functions of the body has hitherto been attempted; the entire Series being unique, will be most valuable to the Teacher, the Student, and to all who wish to become acquainted with the anatomy and physiology of the human economy.

Apoplexy. On Stertor, Apoplexy, and the Management of the Apoplectic State. By ROBERT L. BOWLES, M.D., F.R.C.P. Lond., Consulting Physician to the Victoria Hospital, and to the St. Andrew's Convalescent Hospital, Folkestone. With 13 Illustrations. Price 4s. 6d.

"The information is both practical and useful, and based on extensive clinical and experimental investigation. The principles advocated by the author deserve to be more widely known and acted on than they are at present."—*British Medical Journal.*

"The author has produced a book which is at present the only authority on the subject."—*Medical Press.*

Apoplexy. Diagnosis and Treatment of Apoplexy. By T. STRETCH DOWSE, M.D., F.R.C.P.E., formerly Medical Superintendent, Central London Sick Asylum. Price 1s.

Army Hygiene. Lessons in Military Hygiene and Surgery. By Surgeon-General GORDON, M.D., C.B., Hon. Physician to H.M. the Queen. Illustrated. Price 10s. 6d.

Artistic Anatomy. Anatomy of the External Forms of Man, for the use of Artists, Sculptors, etc. By Dr. J. FAU. Used at the Government School of Art, South Kensington. Twenty-nine plates. Folio. New edition. 30s. coloured, 15s. plain.

Artistic Anatomy. Elementary Anatomical Studies of the Bones and Muscles, for Students and Schools, from the drawings of J. FLAXMAN, R.A. Lately used as a Text-book in the Art Schools at South Kensington. 20 plates, with Text, price 2s.

Artistic Anatomy. The Student's Manual of Artistic Anatomy. With 25 etched plates of the bones and surface muscles of the human figure. By W. J. MUCKLEY. Used at the Government School, South Kensington. Second edition. Price 5s. 6d.

Artistic Anatomy. Elementary Artistic Anatomy of the Human Body. From the French of Dr. FAU. With English Text. Used at the Government School of Art, South Kensington. Price 5s.

Artistic Anatomy. Description of the Bones and Muscles that influence the External Form of Man. With 43 plates. By JOHN C. L. SPARKES, Principal of the National Art Training School, South Kensington. Adopted as a text-book at the Government Art Schools. Price 7s. 6d.

Artistic Drawing. Second Grade Perspective (Theory and Practice), containing 21 block illustrations, 20 plates, and many examination exercises. Used at the Government Science and Art Schools. By H. J. DENNIS, Art Master, Lambeth School of Art, Dulwich College, etc. Price 2s. 6d.

Artistic Drawing. Third Grade Perspective, for the use of Art Students. By H. J. DENNIS. Used at the Science and Art Schools. In two parts, 7s. 6d. each. Part 1, Angular and Oblique Perspective. Part 2, Shadows and Reflections; or, half-bound leather in one vol., price 15s.

Artistic Drawing. The Prototype of Man, giving the natural laws of Human proportion in both sexes. A manual for artists and professors of drawing. By CHAS. ROCHET, of Paris. Price 1s.

Artists' Colours. Their Preparation, Uses, etc. (See Colours.)

Artistic Drawing. A Manual of the Proportions of the Human Body for Artists. By BERTRAM C. A. WINDLE, M.A., M.D., D.SC., Queen's Professor of Anatomy in the Mason's College, Professor of Anatomy to the Royal College of Artists, and Lecturer in the Municipal School of Birmingham. [*In the Press.*

Asthma. On Bronchial Asthma—its Causes, Pathology and Treatment. Lettsomian Lectures. By J. C. THOROWGOOD, M.D., F.R.C.P. London, Senior Physician to the City of London Hospital for Diseases of the Chest. Third edition. Price 3s.

Astronomy. The Stars and the Earth; or, Thoughts on Time Space, and Eternity. With Notes by R. A. PROCTOR, B.A., Fourteenth thousand. Price 1s.

Ataxia. Nervous Affections associated with the Initial or Curative Stage of Locomotor Ataxy. By T. STRETCH DOWSE, M.D., F.R.C.P.E. Second Edition. Price 2s.

Aural Diseases. (See Ear.)

Bacteriology. Researches in Micro-Organisms, including recent Experiments in the Destruction of Microbes in Infectious Diseases, etc. By A. B. GRIFFITHS, Ph.D., F.C.S., F.R.S.E. With 52 Illustrations. Price 6s.

"An enormous amount of material the author has taken great trouble to collect a large number of the references bearing on the points he mentions."—*Lancet.*

"The work . . . may be recommended to those who wish to have in a convenient form a very large number of facts and references relating to bacteria."—*British Medical Journal.*

Bacteriology. The Germ Theories of Infectious Diseases. By JOHN DRYSDALE, M.D., F.R.M.S., President of the Liverpool Microscopical Society. Price 1s.

Bacteriology A Parasitic or Germ Theory of Disease: the Skin, Eye, and other affections. By JABEZ HOGG, M.R.C.S., Consulting Surgeon to the Royal Westminster Ophthalmic Hospital. Second edition, price 2s. 6d.

Bacteriology. Guide to the Demonstration of Bacteria in the Tissues. By Dr. H. KÜHNE, of Wiesbaden. Translated and Edited by VINCENT DORMER HARRIS, M.D. Lond., F.R.C.P., Demonstrator of Physiology at St. Bartholomew's Hospital. Price 2s. 6d.

Bacteriology. Microbes in Fermentation, Putrefaction, and Disease. By CHARLES CAMERON, M.D., LL.D. M.P. Price 1s.

Professor Tyndall, F.R.S., writes: "Matthew Arnold himself could not find fault with its lucidity, while as regards knowledge and grasp of the subject I have rarely met its equal."

Bandaging. A Manual for Self-instruction. By C. H. LEONARD, M.A., M.D., Professor of Diseases of Women in the State College, Michigan. With 139 illustrations. Price 3s. 6d.

Bladder. On Diseases of the Bladder, Prostate Gland, and Urethra. By F. J. GANT, F.R.C.S., Senior Surgeon to the Royal Free Hospital. Fifth Edition. Price 12s. 6d.

Botany. A Dictionary of British Plants and Flowers; their names, pronunciation, origin, etc. By H. P. FITZGERALD. Price 2s. 6d.

Botany. Aids to Botany. Outlines of the Elementary Facts, including a Description of some of the most important Natural Orders. By C. E. ARMAND SEMPLE, B.A., M.B. Cantab., M.R.C.P. Lond. Price 2s. 6d. cloth; 2s. paper wrapper.

Botany. The Student's Botany. Encyclopædic Glossary. By E. MACDOWEL COSGRAVE, M.D., Lecturer on Botany, Carmichael College. Price 2s. 6d.

Brain. The Building of a Brain. By E. H. CLARKE, M.D. (author of "Sex in Education"). Price 5s.

"Carefully and elegantly written, and full of sound physiology."—*Lancet.*

Brain. On Irritable Brain in Children. By W. H. DAY, M.D., M.R.C.P. Lond., Physician to the Samaritan Hospital for Women and Children. Price 1s. 6d.

Brain. The Physiological and Chemical Constitution of the Brain, based throughout on original researches. By J. L. W. THUDICHUM, M.D., F.R.C.P. Lond. Price 10s. 6d.

Brain. Syphilis of the Brain and Spinal Cord, showing the part which this agent plays in the production of Paralysis, Epilepsy, Insanity, Headache, Neuralgia, Hysteria, and other Mental and Nervous Derangements. By T. STRETCH DOWSE, M.D., F.R.C.P. Ed. Second edition, illustrated. Price 5s.

Brain. On Brain and Nerve Exhaustion (Neurasthenia), and on the Exhaustions of Influenza. By the same author. Price 2s. 6d.

Bronchitis. Chronic Bronchitis: its Forms and Treatment. By J. MILNER FOTHERGILL, M.D. Ed., M.R.C.P. Lond. Second Edition. Price 4s. 6d.

"It bristles with valuable hints for treatment."—*British Medical Journal.*

"The pages teem with suggestions of value."—*Philadelphia Medical Times.*

Burmah. Our Trip to Burmah, with Notes on the Ethnology, Geography, Botany, Habits and Customs of that Country, by Surgeon-General GORDON, C.B., M.D., Physician to the Queen. Illustrated with numerous Photographs, Maps, Coloured Plates, and Sketches in gold by native Artists. Price 21s.

"We lay down this book, impressed with its many beauties, its amusing sketches and anecdotes, and its useful and instructive information."—*The Times.*

Cancer and its Complications. The Local Origin of Cancer from the Various Parts of the Body, Preventive and Curative Treatment, etc. By C. E. JENNINGS, F.R.C.S. Eng., M.S., M.B. 3s. 6d.

Cancer of the Mouth, Tongue and Œsophagus. By F. BOWREMAN JESSETT, F.R.C.S. Eng., Surgeon to the Cancer Hospital.

Case Books. A Pocket Case-book for Practitioners and Students. With diagrams, charts, and suggestions for note-taking. By ALEX. THEODORE BRAND, M.D., C.M. Bound in limp leather cover. Price 4s. Loose sheets per doz. 1s., 50 3s. 6d. 100 6s.

Case Taking. Cardiac Outlines for Clinical Clerks and Practitioners; and First Principles in the Physical Examination of the Heart for the Beginner. By W. EWART, M.D., F.R.C.P. Lond., Physician to St. George's Hospital, London. With fifty illustrations. Intended as a Pocket Companion at the Bedside. The outlines are designed to illustrate the methods and the results of the physical examination of the heart in health and in disease, and to assist the student in recording his clinical observations.

*** A supply of thoracic and cardiac outlines (4½ by 3¾ inches), on gummed paper, will be included in each copy. Price 5s. 6d.

Case Taking. Symptoms and Physical Signs, a formulary for medical note-taking, with examples. By the same author. Price 1s.

Case Books. Student's Case-book. For recording cases as seen, with full instructions for methodizing clinical study. By GEORGE BROWN, M.R.C.S., Gold Medallist, Charing Cross Hospital. Fourth thousand, cloth. Price 1s. net.

Case-book. Suggestions for a plan of taking notes in medical cases. By GEO. F. DUFFEY, M.D. Dublin. Price 6d.

Chemistry. Aids to Chemistry. By C. E. ARMAND SEMPLE, B.A. M.B. Cantab., M.R.C.P. Lond.

Part I.—Inorganic. The Non-metallic Elements. Price 2s. 6d., cloth; 2s. paper wrapper.

Part II.—Inorganic. The Metals. Price 2s. 6d. cloth; 2s. paper.

Part III.—Organic. Cloth, 2s. 6d.; paper, 2s.

Part IV.—Tablets of Chemical Analysis. Price 1s. 6d. and 1s.

"Students preparing for Matriculation at the London University, and other Examinations, will find it simply invaluable."—*Students' Journal.*

Chemistry. A Manual of Chemistry; a complete guide to Lectures and Laboratory work for beginners in Chemistry, and a text-book for students in Medicine and Pharmacy. By W. SIMON, Ph.D., M.D., Professor of Chemistry. Sixteen woodcuts and coloured plates representing 56 Chemical reactions. Price 15s

Chemistry. Plant Analysis, Quantitative and Qualitative. By G. DRAGENDORFF, Professor of Chemistry and Pharmacy in the University of Dorpat. Translated by HY. G. GREENISH, A.I.C. Price 7s. 6d.

Chemistry. The Principles of Theoretical Chemistry, with special reference to the Constitution of Chemical Compounds. By IRA REMSEN, M.D., Ph.D., Professor of Chemistry in the John Hopkins University. Fourth Edition. [*In the Press.*

Chemistry. The Student's Hand-book, with Tables and Chemical Calculations. By H. LEICESTER GREVILLE, F.I.C., F.C.S. Second Edition. Price 6s.

Chemistry. Chemical Notes for Pharmaceutical Students. By A. RIVERS WILLSON. Second Edition. Price 3s. 6d.

"Of exceeding value to students going up for examination."—*Pharmaceutical Journal.*

Chemistry. A Short Manual of Analytical Chemistry for Laboratory Use. By JOHN MUTER, Ph.D., M.A., F.C.S. Second Edition. [*In the Press.*

Children. The Diseases of Children: their History, Causes and Treatment. By C. E. ARMAND SEMPLE, B.A., M.B. Cantab., M.R.C.P. Lond., Physician to the North-Eastern Hospital for Children. Price 6s.

Children. Confidential Chats with Mothers on the healthy rearing of Children. By Mrs. BOWDICH. Price 2s.

Children. On Tetany in Young Children. By J. ABERCROMBIE, M.D., M.R.C.P. Lond. Price 2s.

China. Reports of the Medical Officers of the Chinese Imperial Maritime Customs Service, from 1871 to 1882, with the History of Medicine in China. Compiled by Surgeon-General GORDON, M.D., C.B., Physician to Her Majesty the Queen. Price 21s.

Cholera: How to Prevent and Resist it. By Professor VON PETTENKOFER and T. WHITESIDE HIME, A.B., M.B. Second edition. Illustrated. Price 3s. 6d.

Cholera. The Cholera Microbe and How to Meet It. Read at the Congress of the British Medical Association. By CHARLES CAMERON, M.D., LL.D., M.P. Price 1s.

Climatology. Ventnor and the Undercliff. By J. M. WILLIAMSON, M.D., M.B. Ed., Hon. Surgeon to the National Hospital for Consumption. Second edition, price 1s.

Climatology. The Demography of South Australia. By THOS. BORTHWICK, M.D. Ed., Medical Officer of Health for South Australian District. With three plates. Price 2s. 6d. 1891.

Climatology. The Book of Climates in all Lands. A Handbook for Travellers, Invalids, and others in search of Health and Recreation. By D. H. CULLIMORE, M.D., M.R.C.P. Lond., Surgeon in H.M. Indian Army (retired). With a chapter on the Climate of Africa as it affects Europeans by Surgeon PARKE, D.C.L. Second edition, cloth limp. Price 4s. 6d.

"A very useful book."—*The Graphic.*
"There is much which entitles it to a large circulation."—*Westminster Review.*
"A work of supreme interest to the traveller in search of health."—*Freeman's Journal.*

Coca. The Coca of Peru, its Remedial Principles, and Healing Powers. By J. L. W. THUDICHUM, M.D., F.R.C.P. Price 1s.

Colours. A Hand-book for Painters and Art Students, on the use of Colours, Vehicles, etc. By W. J. MUCKLEY. Price 3s. 6d.

Consumption. Consumption as a Contagious Disease; the Merits of the Air of Mountains and Plains. By D. H. CULLIMORE, M.D., M.R.C.P. Lond., formerly H.M. Indian Army. Price 5s.

Consumption. Consumption and its Treatment by the Hypophosphites. By JOHN C. THOROWGOOD, M.D., F.R.C.P. Lond., Physician to the City of London Hospital for Diseases of the Chest, Victoria Park. Third edition, price 2s. 6d.

Consumption. A Re-investigation of its Causes. By C. W. DE LACY EVANS, M.R.C.S. Eng. Price 2s. 6d.

Consumption. How to Prevent and Treat Consumption. By G. RUTLAND HOWAT, B.A. Lond. Price 2s. 6d.

Consumption. An Essay on Consumption: Its True Nature and Successful Treatment. By GODWIN W. TIMMS, M.D. Lond. Second edition, revised and enlarged, price 10s. 6d.

Consumption. Tuberculosis from a Sanitary and Pathological Point of View. By G. FLEMING, C.B., F.R.C.V.S., President of the Royal College of Veterinary Surgeons. Price 1s.

Consumption. The Pathology of Tuberculosis (Pulmonary Tuberculosis and Tubercular Phthisis). A course of Past Graduate Lectures delivered at Queen's Hospital, Birmingham, 1891. By GEO. F. CROOKE, M.D., Physician and Pathologist to Queen's Hospital, and Lecturer on Pathology in Queen's College. Price 2s. 6d.

Deafness. (See Ear.)

Deaf-mutism. On the Education of Deaf-mutes by Lip-Reading and Articulation. By Professor HARTMANN. Translated by Dr. PATTERSON CASSELLS. Price 7s. 6d.

"The instruction of deaf-mutes is here rendered easy."—*Athenæum.*
"We can honestly recommend it to anyone seeking for knowledge."—*The Lancet.*

Deformities. The Nature and Treatment of Deformities of the Human Body. By LAMBERT H. ORMSBY, M.B. Dub., Surgeon to the Meath Hospital and Dublin Infirmary. Price 5s.

Dental Surgery. A Manual of Dental Surgery: Including Special Anatomy and Pathology. For Students and Practitioners. By HENRY SEWILL, M.R.C.S., L.D.S. Eng. Third edition, with upwards of 200 illustrations, chiefly original, price 10s. 6d.

Dental. Dental Caries and the Prevention of Dental Caries. By HENRY SEWILL, M.R.C.S. and L.D.S. Eng. Second edition. Price 2s. 6d.

Dental. Aids to Dental Surgery. By ARTHUR S. UNDERWOOD, M.R.C.S., L.D.S. Eng. Price 2s. 6d. cloth; 2s. paper.

Dental. Aids to Dental Histology. By the same Author. Illustrated. Price 2s. 6d. cloth; 2s. paper wrapper. 1892.

Dental. Journal of the British Dental Association. Monthly, price 6d.

Dental. Manual for the Dental Laboratory. A Practical Guide to its Management, Economy, and Methods of Manipulation. By CHARLES HUNTER, Author of "A Treatise on Mechanical Dentistry." Price 5s.

Dermatology. (See Skin.)

Dermoids. A Course of Lectures delivered at the Royal College of Surgeons, England, 1889, on "Evolution in Pathology." By J. BLAND SUTTON, F.R.C.S., Hunterian Professor, Royal College of Surgeons. Price 3s., profusely illustrated.

"We commend the study of this book to all interested in the elucidation of pathological problems."—*The Lancet.*

Diagnosis. The Physiological Factor in Diagnosis. By J. MILNER FOTHERGILL, M.D., M.R.C.P. Lond. Second edition. Price 7s. 6d.

"An exceedingly clever and well-written book, put together in a very plain, practical, and taking way."—*Edinburgh Medical Journal.*

Diagnosis, Aids to. Three Parts. Price 1s. and 1s. 6d. each.
Part I.—Semeiological. By J. MILNER FOTHERGILL, M.D.
Part II.—Physical. By J. C. THOROWGOOD, M.D., F.R.C.P.
Part III.—What to Ask the Patient. By J. MILNER FOTHERGILL, M.D.

"A mine of valuable information."—*Edinburgh Medical Journal.*

New edition. Containing the three parts. Edited by Dr. THOROWGOOD. In one volume. Price 3s. 6d. cloth.

Diphtheria. Diphtheria, its Causes, Pathology, Diagnosis, and Treatment. By R. HUNTER SEMPLE, M.D., F.R.C.P. Lond. Second edition, price 2s. 6d.

Diseases. The Classification and Nomenclature of Diseases. By A. RABAGLIATI, M.A., M.D., Senior Surgeon Bradford Infirmary, Surgeon to the Children's Hospital. Price 2s. 6d.

Domestic Medicine. Handbook of Popular Medicine for family instruction, colonists and others out of reach of medical aid. By G. H. NAPHEYS, A.M., M.D. With movable plate and 100 illustrations. Price 7s. 6d.

Diet. How to Prolong Life. Showing the Diet and Agents best adapted for a lengthened prolongation of existence. By C. W. DE LACY EVANS, M.R.C.S. Second edition. Price 5s.

(See also Food.)

Diseases of Women. (See Gynæcology.)

Dyspepsia. (See Indigestion.)

Ear. Diseases of the Ear. By GEORGE P. FIELD, M.R.C.S., Aural Surgeon to St. Mary's Hospital, and Lecturer on Aural Surgery. Fourth edition, rewritten and brought up to date. [*In the Press.*

Ear. On Unrecognised Lesions of the Labyrinth. Being the Cavendish Lecture for 1890. By ALEX OGSTON, M.D., C.M., Regius Professor of Surgery in the University of Aberdeen. Illustrated. Price 1s.

Ear. On Vascular Deafness. By ROBERT J. COOPER, M.D., Trinity College, Dublin. Price 3s. 6d.

Ear. Otorrhœa; or, Discharge from the Ears: Causes and Treatment. By W. DOUGLAS HEMMING, F.R.C.S. Ed. Price 1s.

Ear. Subjective Noises in the Head and Ears. Their Etiology, Diagnosis and Treatment. By H. MACNAUGHTON JONES, M.D., F.R.C.S. I. and E., Fellow of the Medical, Obstetrical, Gynæcological and Ophthalmological Societies of London. Profusely illustrated, price 4s. 6d.

Ear. The Hygiene of the Ear. By CAVALIERE VINCENZO COZZOLINO, Professor in the Royal University of Naples, and Director of the Hospital Clinic for Diseases of the Ear, Nose, and Throat. Translated from the fifth Italian edition by James Erskine, M.A., M.B. [*In the Press.*

Ear. Practitioner's Hand Book of Diseases of the Ear and Naso-Pharynx. By Dr. H. MACNAUGHTON JONES and Mr. W. E. H. STEWART, F.R.C.S.E. Fourth edition, with plates and numerous woodcuts. Price 10s. 6d.

Ear. The Anatomical and Histological Dissection of the Human Ear, in its Normal and Diseased Conditions. By Professor POLITZER of Vienna. Translated at the author's request by GEORGE STONE, F.R.C.P. Ed. Profusely illustrated. Price 10s. 6d.

Electricity. A Manual of Practical Medical Electricity. By DAWSON TURNER, B.A., M.D., F.R.C.P. Ed., M.R.C.P. Lond. [*In the Press.*

In this work an endeavour has been made to place before the student and practitioner a trustworthy modern account of and guide in the practice of medical and surgical electricity, in a manner as free as possible from unnecessary theory and technicality.

It is hoped that the practitioner, with this book at his elbow, will be enabled not only to select the apparatus best suited for his purpose, but also to understand, manage and apply it in a rational, as opposed to a purely mechanical or empirical, manner.

The work has been divided into two parts: the first treats of electro-physics, and includes an account of static, galvanic and Faradic electricity, the secondary cell, and the current from a dynamo. The second part of electro-diagnosis, electro-surgery and electro-therapeutics. The book does not presuppose previous electrical studies.

Electricity. Electricity in General Practice. By W. BOLTON TOMSON, M.D. Price 2s. 6d.

Etiquette. A few Rules of Medical Etiquette. By a L.R.C.P. Lond. Price 1s.

Examinations. Aids to Examinations. By W. D. HEMMING, F.R.C.S. Ed., and H. AUBREY HUSBAND, M.B., F.R.C.S. Being Questions and Answers on Materia Medica, Medicine, Midwifery, Pathology, and Forensic Medicine. Price 1s. 6d. cloth, 1s. paper.

Examinations. A Guide to the Examinations of the conjoint Board in England and for the Fellowship of the College of Surgeons, with Examination Papers. By F. J. GANT, F.R.C.S. Sixth edition, revised and enlarged. Price 5s. net.

Examinations. A Guide to the Examinations of the Apothecaries' Society of London with Questions, Tables on Materia Medica, etc. By W. E. DAWSON, L.S.A. Second edition. Price 2s. 6d.

"May be studied with great advantage by a student, shortly before presenting himself for examination."—*British Medical Journal.*

Examinations. Examination Questions on the Medical Sciences, including the Army, Navy and University Examinations. Selected and arranged by JAMES GREIG LEASK, M.B. Abdn. Second edition. Price 2s. 6d.

"Dr. Leask's questions are particularly suitable for pure examination study. Students should test themselves thereby."—*British Medical Journal.*

Examination Cards: Questions and Answers. By A. T. SCHOFIELD, M.D. Pathology, 2 sets, 9d. each, net. Minor Surgery, Bandaging, etc., 9d., net.

Eye. Aids to Ophthalmic Medicine and Surgery. By J. HUTCHINSON, jun., F.R.C.S., Ophthalmic Surgeon to the Great Northern Hospital. Cloth, 2s. 6d.; paper, 2s.

Eye. Ophthalmic Notes. A Pocket Guide to the Nature and Treatment of Common Affections of the Eye. By A. VERNON FORD, M.R.C.S. Eng., L.K.Q.C.P. Ire. Price 2s. 6d.

Eye. The Detection of Colour Blindness, from a practical point of view. By F. W. EDRIDGE-GREEN, M.D., F.G.S., Author of "Memory," etc., etc. Price 1s.

Eye. The Cure of Cataract and other Eye Affections. By JABEZ HOGG, M.R.C.S., Consulting Surgeon to the Royal Westminster Ophthalmic Hospital. Third edition. Price 2s. 6d.

Eye. On Impairment or Loss of Vision from Spinal Concussion or Shock. By the same Author. Price 1s. 6d.

Eye. The Functions of Vision and its Anomalies. By Dr. GIRAUD TEULON. Translated by LLOYD OWEN, F.R.C.S.I., Surgeon to the Midland Eye Hospital, Ophthalmic Surgeon to the Hospital for Sick Children, Birmingham. Price 5s.

Eye. Movable Atlas of the Eye and the Mechanism of Vision. By Prof. G. J. WITKOWSKI. Price 7s. 6d. (See Anatomy.)

(*The following four works have been translated for the National Society for the Prevention and Cure of Blindness.*)

Mind your Eyes. By F. SARCEY. Price 2s. 6d.

The Causes and Prevention of Blindness. By Professor FUCHS, University of Liége. Price 7s. 6d.

How to Preserve the Sight. By Dr. MAGNÉ. Price 6d.

On Spectacles, their History and Uses. By Prof. HORNER. Price 6d.

Fasting and Feeding, Psychologically considered. By L. S. FORBES WINSLOW, M.B. Cantab., D.C.L. Oxon. Price 2s.

Fever. On the Endemic Hæmaturia of Hot Climates, caused by the presence of Bilharzia Hæmaturia. By F. H. H. GUILLEMARD, M.A., M.D., F.R.G.S. Price 2s.

Fever. Text-Book of the Eruptive and Continued Fevers. By JOHN WILLIAM MOORE, B.A., M.D., M. Ch. Univ. Dub., F.R.C.P.I., Joint Professor of Practice of Medicine in the Schools of Surgery of the Royal College of Surgeons in Ireland, Physician to the Meath Hospital, Dublin, Consulting Physician to Cork Street Fever Hospital, Dublin, ex-Scholar and Diplomate in State Medicine of Trinity College, Dublin. Price 15s.

Fever Charts. Daily Clinical Fever Charts, to record the progress of a case of continued or eruptive fever. By F. MAGEE FINNY, M.D. Price 5s.

Food. Aids to the Analysis of Food and Drugs. By H. AUBREY HUSBAND, M.B., F.R.C.S., Lecturer on Public Health in the Edinburgh Medical School. Price 1s. 6d. cloth; 1s. paper.

Food. The Healthy Manufacture of Bread. By B. W. RICHARDSON, M.D., F.R.S. Price 6d. paper cover; cloth, 1s., with Vignette.

Foot. Movable Atlas of the Foot; its Bones, Muscles, etc. By Prof. WITKOWSKI. Price 7s. 6d. (See Anatomy.)

Forensic Medicine. The Maybrick Case. A Treatise by A. M. MACDOUGALL, B.A., LL.D. Price 10s. 6d.

Forensic Medicine. The Student's Handbook of Forensic Medicine and Public Health. By H. AUBREY HUSBAND, M.B., F.R.C.S.E. Sixth edition. Price 10s. 6d.

Forensic Medicine. Aids to Forensic Medicine and Toxicology. By W. DOUGLAS HEMMING, F.R.C.S.E., and H. AUBREY HUSBAND, M.B., F.R.C.S.E. Fifth thousand. Price 2s. 6d. cloth, 2s. paper.

Geology. Field Geology, with a Section on Palæontology. By W. HY. PENNING, F.G.S., of H.M. Geological Survey, and A. J. JUKES-BROWNE, B.A., F.G.S. With woodcuts and coloured map. Second edition, revised and enlarged. Price 7s. 6d.

"Others have taught us the principles of the science, but Mr. Penning, as an accomplished field-geologist, introduces us to the practice."—*The Academy.*

Geology. Engineering Geology. By the same Author. Illustrated with coloured maps and woodcuts. Price 3s. 6d.

"A full and lucid description of surveying and mapping, the diagnosing of the various minerals met with, the value of sites, rocks, etc."—*Popular Science Review.*

Geometry. Aids to Analytical Geometry. I. The Straight Line and Circle. By A. LE SUEUR, B.A. Cantab. Second edition, 2s.

II. The Conic Sections, with solutions of questions set at the London University and other Examinations by GEORGE HEPPEL, M.A. Cantab. Price 2s.

Gout. A Treatise on Gout. By AUSTIN MELDON, M.K.Q.C.P. F.R.C.S.I., Senior Surgeon Jervis Street Hospital, Consulting Physician Dublin General Infirmary. Tenth edition. Price 2s. 6d.

Gout. The Nature and Treatment of Gout. By Professor EBSTEIN of Gottingen University. Translated by J. E. BURTON, L.R.C.P. Lond. Price 3s. 6d.

Gymnastics. The Prevention and Cure of Many Chronic Diseases by Movements. By M. ROTH, M.D., F.R.C.S. Eng. With 90 engravings, price 5s.

Paralysis in Infancy, Childhood, and Youth, and on the Prevention and Treatment of Paralytic Deformities. Same Author. 3s. 6d.

The Prevention and Rational Treatment of Lateral Spine Curvature. (Gold Medal of the International Health Exhibition, 1884.) 200 engravings. Price 5s.

Gynæcology. Brandt's Treatment of Uterine Disease and Prolapsus by the Movement Cure. Edited and translated by Dr. ROTH. Price 5s.

Gynæcology. The Diseases of Women and their Treatment. By H. MACNAUGHTON JONES, M.D., F.R.C.S.I., F.R.C.S.E., Examiner in Midwifery, Royal College of Surgeons, Ireland. Fifth edition. Illustrated, price 10s. 6d.

"A storehouse of information."—*The Lancet.*
"The work of a mature and experienced authority."—*British Medical Journal.*
"Of exceptional merit drawn from a field of wide personal experience."—*Medical Press.*

Gynæcology. Aids to Gynæcology. By ALFRED S. GUBB, M.D. Paris, M.R.C.S., L.R.C.P., D.P.H., Obstetric Assistant and Gold Medallist Westminster Hospital. Second edition. Cloth, 2s. 6d., and 2s. sewn.

Hair. The Hair: its Growth, Care, Diseases, and Treatment. By C. H. LEONARD, M.A., M.D. Illustrated, price 7s. 6d.

Hair. A Synopsis of Diseases of the Skin and Hair. By R. GLASGOW-PATTESON, M.B., Surgeon to St. Vincent's Hospital. Price 1s.

Hand. Movable Atlas of the Hand; its Bones, Muscles and Attachments. By Prof. WITKOWSKI. Price 7s. 6d. (See Anatomy.)

Hay Fever: its Causes, Treatment, and Effective Prevention; Experimental Researches. By CHAS. HARRISON BLACKLEY, M.D. Second edition, revised and enlarged. Price 10s. 6d.

Heart. On Insufficiency of Aortic Valves in connection with Sudden Death. By JOHN COCKLE, A.M., M.D., F.R.C.P., Physician to the Royal Free Hospital. Second edition. Price 2s. 6d.

Heart. Contributions to Cardiac Pathology. By the same Author. Price 2s. 6d.

Heart. An Essay on Fatty Heart. By HENRY KENNEDY, A.B., M.B. Physician to the Whitworth Hospitals. Price 3s. 6d.

Heredity and Disease. From Generation to Generation. By DOUGLAS LITHGOW, LL.D., M.R.C.P., Lond. Price 4s. 6d.

Hernia and Intestinal Obstruction. By J. ROCHE, M.D. 6d.

Histology. Introduction to Practical Histology. By GEORGE THIN, M.D. Price 5s.

Histology. Methods of Preparing Brain, Spinal Cord, and Nerves for Microscopical Examination. By EDWIN GOODALL, M.D. Lond. [*In the Press.*

History of the Royal College of Surgeons in Ireland. By Sir C. A. CAMERON. Price 10s. 6d.

Hydrophobia. Inoculation for Rabies and Hydrophobia. A Study of the Literature of the subject. By Surgeon-General C. A. GORDON, C.B. Price 2s. 6d.

Hydrophobia. Comments on the Reports of the Committee on M. Pasteur's Treatment. By Surgeon-General C. A. GORDON, M.D., C.B. Price 2s. 6d.

Hydropathy, or the Practical Use of Cold Water. By E. MARLETT BODDY, F.R.C.S., F.S.S., L.R.C.P. Price 1s.

Hydropathy. Notes of Visits to Contrexéville and Royat-les-Bains. By F. R. CRUISE, M.D. Price 6d.

Hydropathy. Vichy and its Therapeutical Resources. By PROSSER JAMES, M.D., M.R.C.P. Lond., Lecturer on Materia Medica and Therapeutics at the London Hospital. Price 2s. 6d.

Hygiene. Lessons in Military Hygiene and Surgery, from the Franco-Prussian War. Prepared on behalf of Her Majesty's Government. By Surgeon-General GORDON, M.D., C.B., Hon. Physician to the Queen. Illustrated, price 10s. 6d.

Hygiene. A Manual of Sanitation; or, First Help in Sickness and when Wounded. Alphabetically arranged. By the same Author. Cloth, 2s. 6d.; sewn, 1s.

"A most useful and practical manual, and should be placed in the hands of officers and men alike."—*The Graphic.*

Hygiene. The Elements of School Hygiene for the Use of Teachers and Schools. By W. E. ROTH, B.A. Price 3s .6d.

Hygiene. Theatre Hygiene, a study in construction, safety and healthy arrangement. By W. E. ROTH, B.A. Oxon. Price 1s. 6d.

Hygiene. Healthy Homes. By STANLEY HAYNES, M.D., M.R.C.S., F.R.G.S. Price 1s.

Hygiene. Notes on Nuisances, Drains, and Dwellings. By W. H. PENNING, F.G.S. Second Edition. Price 6d.

Hygiene. Short Lectures on Sanitary Subjects. By RICHARD J. HALTON, L.K.Q.C.P., L.R.C.P. Ed., L.R.C.S.I., etc. Price 5s.

Hygiene. A Manual of Naval Hygiene, with Instructions and Hints on the Preservation of Health and the Prevention of Disease on board Ship. By JOSEPH WILSON, M.D. Second edition. 10s. 6d.

Hygiene. The Sanitation of Public Institutions. The Howard Prize Essay. By R. D. R. SWEETING, M.R.C.S., Medical Superintendent of the Western Fever Hospital. Price 3s. 6d.

Hypnotism. Psycho-Therapeutics. Treatment by Hypnotism and Suggestion. By J. LLOYD TUCKEY, M.D. Third Edition, enlarged. Price 6s.

Indigestion: a Manual of the Diagnosis and Modern Treatment of the Different Varieties of Dyspepsia. By GEORGE HERSCHELL, M.D. Lond. Crown 8vo., 202 pp., price 3s. 6d.

Inflammation. The State of the Blood and the Bloodvessels in Inflammation. By T. WHARTON JONES, F.R.C.S., F.R.S., Emeritus Professor of Ophthalmic Medicine and Surgery in University College, London. Price 2s. 6d.

"The work is that of a man of genius of the highest order."—Dr. RICHARDSON, F.R.S., in *Asclepiad.*

"A thoughtful study founded on the ripe experience of an author entitled to the highest respect."—*Medical Press.*

International Medical Congress. The Commemorative Portrait-Picture of the International Medical Congress, 1881. Designed and executed by Mr. BARRAUD; nearly 700 Likenesses of Members, representing Medicine and Surgery in every part of the world; special sittings accorded for every Portrait.

The Picture is Printed by the New Permanent Carbon Process in two Sizes:

EXTRA SIZE, 47 × 30, MOUNTED, BUT UNFRAMED	£7 10s.	FRAMED -	£10 0s.
POPULAR SIZE, 29 × 20, MOUNTED, BUT UNFRAMED	£3 3s.	FRAMED -	£4 10s.

Intestinal Surgery. (See Abdominal Surgery.)

Insanity. (See Lunacy.)

Kidneys. Vaso-Renal Change *versus* Bright's Disease. By J. MILNER FOTHERGILL, M.D. Ed. Price 7s. 6d.

Kidneys. Bright's Disease of the Kidneys. By Professor J. M. CHARCOT. Translated by H. B. MILLARD, M.D., A.M. Revised by the Author, with coloured plates, price 7s. 6d.

Lunacy. Handbook for the Instruction of Attendants on the Insane. Prepared by a Committee of the Medico-Psychological Association. With Appendix containing Lists of Asylums and Licensed Houses. Second edition. [*In Preparation.*

Materia Medica. A Dictionary of Materia Medica and Therapeutics. A Résumé of the Action and Doses of all Officinal and Non-officinal Drugs now in Common Use. By C. HENRI LEONARD, M.A., M.D., and THOS. CHRISTY, F.L.S., F.C.S. Price 6s. 1892.

This volume has been in preparation for the past four years. The drugs of as late introduction as 1891 are to be found in its pages. The authors claim to have incorporated everything of merit, whether officinal or non-officinal, that could be found either in standard works or from many manufacturers' catalogues. The scheme embraces the Pronunciation, Genitive case-ending, Common Name, Dose, and Metric Dose. Then the Synonyms, English, French, and German. *If a Plant* the Part Used, Habitat, Natural Order, and Description of Plant and Flowers, with its Alkaloids, if any. *If a Mineral*, its Chemical Symbol, Atomic Weight, looks, taste, and how found, and its peculiarities. Then the Action and Uses of the Drug, its Antagonists, Incompatibles, Synergists and Antidotes. Then follow its Officinal and Non-officinal preparations, with their Medium and Maximum Doses. Altogether it will be found a handy volume for either the Physician, Student, or Druggist, and will be frequently appealed to if in one's possession.

"Will, we are sure, fulfil a long-felt want."—*British and Colonial Druggist.*
"Well up to date. . . . Contains an index of great value."—*Chemist and Druggist.*

Materia Medica. Comprising the Drugs contained in the Schedule issued by the Conjoint Board of the Royal College of Physicians and Surgeons. Arranged by MAURICE WILLIAMS, Principal of the City School of Chemistry and Pharmacy. Price 3s. 6d.

Materia Medica. Table of Doses. By J. H. ALLAN, F.C.S. Price 6d., cloth.

Materia Medica. A Key to Organic Materia Medica. By JOHN MUTER, Ph.D., M.A., F.C.S., President of the Society of Public Analysts. Third edition. Price 12s. 6d.

Materia Medica. Aids to Materia Medica and Therapeutics. By C. E. ARMAND SEMPLE.

Part I.—The Non-metallic and Metallic Elements, Alcoholic and Ethereal Preparations, etc. Cloth, 2s. 6d.; paper, 2s.

Part II.—The Vegetable and Animal Substances. 2s. 6d., 2s.

Part III.—Classification of Remedies. Cloth, 1s. 6d.; paper, 1s.

Part IV.—New Remedies of the British Pharmacopœia. Cloth, 2s. 6d.; paper, 2s.

Part V.—Tablets of Materia Medica. Price, cloth, 1s. 6d.; paper, 1s.

Materia Medica and Pharmacy. A Text-Book for Medical and Pharmaceutical Students preparing for Examination. By W. HANDSEL GRIFFITHS, Ph.D., F.C.S., F.R.C.P. Ed. Third edition. Edited by A. S. GUBB, M.D. Paris, L.R.C.P. Lond., M.R.C.S., D.P.H., Gold Medallist, Prizeman in Materia Medica, Westminster Hospital. Price 7s. 6d.

"A book of great value . . . a standard text-book."—*Edin. Med. Journal.*
"One of the ablest, if not the best, work on the subject in our language."—*Med. Press.*

Materia Medica. Notes on Inorganic Materia Medica, and its Chemistry. By J. S. SHARMAN. Second edition. Price 1s. 6d.

Materia Medica. Notes on Materia Medica and Therapeutics. Mineral Drugs, Part I. By J. S. McARDLE. Price 1s.

Medical Charities. The Reform of Our Voluntary Medical Charities. By ROBERT REID RENTOUL, M.D. Price 5s.

Medical Education. Medical Education and Organization. The Hunterian Oration for 1880. By WALTER RIVINGTON, B.A., M.B., F.R.C.S., Surgeon to the London Hospital. Price 1s.

Medical Etiquette. A Few Rules of Medical Etiquette. By a L.R.C.P. Lond. Price 1s.

Medical Jurisprudence. (See Forensic Medicine.)

Medical Laws. Medical Law for Medical Men: their Legal Relations popularly explained. By Professor MEYMOTT TIDY, M.B., F.C.S., Barrister-at-Law, and PERCY CLARKE, LL.B., Solicitor. Leather, gilt edges, price 4s.

Medical Laws. The Laws Relating to Medical Men. By JAMES GREENWOOD, Barrister-at-Law. Price 5s.

"Admirably suited as a guide to the busy practitioner, who frequently runs great risks of becoming involved in legal penalties, in consequence of an imperfect knowledge of the law." —*Glasgow Medical Journal.*

Medical Profession. A Guide to the Medical Profession in all its branches, including the Public Services. By C. R. B. KEETLEY, F.R.C.S. Second edition, revised and enlarged. Price 3s. 6d.

Medical Profession. Medical Men and Manners of the Nineteenth Century. By a Physician. Third Thousand. Price 3s.

"At times scathing, at others amusing, the author is never dull, and writes as one who knows the many blots on our system, and honestly tries to remedy them."—*Medical Press.*

Medicine. Aids to Medicine. By C. E. ARMAND SEMPLE, B.A., M.B. Cantab., M.R.C.P. Lond.

Part I.—General Diseases. Price 2s. 6d. and 2s.

Part II.—The Urine, Kidneys, Stomach, Peritoneum, Throat, and Œsophagus. Third Thousand. Price 2s. 6d. and 2s.

Part III.—Diseases of the Brain, Nervous System, and Spinal Cord. Third Thousand. Price 2s. 6d. and 2s.

Part IV.—Fevers, Skin Diseases. Price 2s. 6d. and 2s.

Medicine. A Chronology of Medicine from the Earliest Times. By J. MORGAN RICHARDS. Price 10s. 6d.

Medicine. Student's Handbook of the Practice of Medicine. By H. AUBREY HUSBAND, M.B., C.M., B.Sc. Fourth edition, revised and enlarged. Illustrated. Price 7s. 6d.

Medico-Military Services. Our Services under the Crown. A Historical Sketch of the Army Medical Staff. By Surgeon-Major A. GORE, M.D., Sanitary Officer on the Staff. Price 6s.

Memory. Its Logical Relations and Cultivation. By F. W. EDRIDGE-GREEN, M.D., F.G.S., Author of "Colour Blindness." Second edition. Price 6s.

Meteorology. The Moon and the Weather: the Probability of Lunar Influence Reconsidered. Showing how storms and depressions may be predicted. By WALTER J. BROWNE (St. Petersburg). Second edition. Price 3s.

Microbes. (See Bacteriology.)

Microscopical Science. The International Journal of Microscopy and Natural Science. Edited for the Postal Microscopical Society by ALFRED ALLEN. Quarterly, with Plates. Price 1s. 6d.

Midwifery. (See Obstetrics.)

Mind. The Training of the Mind for the Study of Medicine. A Lecture delivered at St. George's Hospital. By ROBERT BRUDENELL CARTER, F.R.C.S., Surgeon to the Hospital. Price 1s.

"A remarkable address."—*The Lancet.*
"No one can read it without learning and profiting much."—*Students' Journal.*

Mineral Waters. The Mineral Waters of Europe. A complete Analytical Guide to all the Bottled Waters, and their Medicinal and Therapeutic Values. By Professor TICHBORNE, LL.D., F.C.S., President of the Pharmaceutical Society of Ireland, and M. PROSSER JAMES, M.R.C.P. Lond., Lecturer on Therapeutics, London Hospital. Price 3s. 6d.

"Such a book as this is simply invaluable."—*The World.*

Morals. A Physician's Sermon to Young Men. By WILLIAM PRATT, M.A., M.D., etc. Eighth thousand. Price 1s. cloth.

"The delicate topic is handled wisely, judiciously, and religiously, as well as very plainly."—*The Guardian.*

Morals. Revelations of Quacks and Quackery. With Facts and Cases in Illustration of their Nefarious Practices. By "DETECTOR." Thirtieth thousand. Price 2s.

Morphia. On the cure of the Morphia Habit. By OSCAR JENNINGS, M.D. Paris, F.R.C.S. Eng. Price 2s. 6d.

Nervous Diseases. Functional Nervous Diseases, their Causes and Treatment. By GEO. T. STEVENS, M.D., Ph.D. With plates. Price 12s.

Nervous Diseases. Clinical Notes on Nerve Disorders in Surgical Practice. By GEO. WHERRY, M.A., M.S. Cantab., F.R.C.S. Price 2s.

Nervous Diseases. (See also Brain.)

Nerve Supply. Atlas of Cutaneous Nerve Supply. By JACOB HEIBERG, M.D., and W. W. WAGSTAFFE, F.R.C.S. Containing 10 plates in colours. Price 4s. 6d.

Neuralgia. The Surgical Treatment of Neuralgia of the Fifth Nerve; being the Lettsomian Lectures for 1892. By WM. ROSE, M.B., B.S. Lond., F.R.C.S., Joint Professor of Surgery in King's College, London, and Surgeon to King's College Hospital. Illustrated. Price 3s. 6d.

Nose. (See Throat and Nose.)

Nursing. Questions and Answers on Nursing, for St. John's Ambulance Associations, Nursing Institutes, and Nurses generally. By JOHN W. MARTIN, M.D., Author of "Ambulance Work." Fourth thousand. Price 1s. 6d. net.

Nursing. How to Feed an Infant. With an Appendix on the Common Ailments of Infancy, with their Hygienic and Curative Treatment. By BENSON BAKER, M.D. Price 1s. 6d.

Nursing. How to bring up Children by Hand. By J. FOSTER PALMER, L.R.C.P. Price 6d.

Nursing. Practical Guide for the Young Mother. From the French of Dr. BROCHARD, Director-General of Nurseries and Crêches, with Notes and Hints by a London Physician. Price 2s.

Obstetrics. Aids to Obstetrics. By SAMUEL NALL, M.B. Cantab., M.R.C.P. Lond., First Class Honours Nat. Sci. Cambridge, late Resident Obstetric Assistant, St. Bartholomew's Hospital. Twelfth thousand. Price 2s. 6d. cloth, 2s. paper wrapper.

Obstetrics. Hints for Midwives on Pregnancy and Labour. Abstracts of a Series of Lectures by H. MACNAUGHTON JONES, M.D., M.C.H., F.R.C.S. Price 1s.

Obstetrics. The Diagnosis and Treatment of Extra-uterine Pregnancy. By JOHN STRAHAN, M.D., M.Ch. (The Jenks Triennial Prize Essay awarded by the College of Physicians, 1889.) Price 4s. 6d.

Obstetrics. Hints for the Use of Midwives preparatory to their Examinations. By R. J. M. COFFIN, F.R.C.P. Ed. Second Edition, enlarged. Price 2s.

Odontology. (See Dental.)

Old Age. The Diseases of Sedentary and Advanced Life. By J. MILNER FOTHERGILL, M.D., M.R.C.P. Lond. Price 7s. 6d.

Ophthalmology. (See Eye.)

Osteology. Osteology for Students, with Atlas of Plates. By ARTHUR TREHERN NORTON, F.R.C.S., Surgeon to, and Lecturer on Surgery at, St. Mary's Hospital. Atlas and Text in one volume, 7s. 6d.; in two volumes, 8s. 6d.

"The handiest and most complete handbook on Osteology."—*The Lancet.*

Osteology. Atlas of the Skeleton and its Articulations, showing the Bones and Ligaments of the Human Body and Limbs. By Professor WITKOWSKI. Price 7s. 6d. (See Anatomy.)

Overwork. Overwork and Premature Mental Decay: its Treatment. By C. H. F. ROUTH, M.D., M.R.C.P. Lond. Fourth edition. Price 2s. 6d.

Pathology. Handbook of Medical Pathology. By H. G. SUTTON, M.B., F.R.C.P. Lond., late Physician to, and Lecturer on Pathology at, the London Hospital. Price 5s.

"Such a work is to be accepted with gratitude for the thoughts it contains, and the facts on which they are based."—*The Lancet.*

Pathology. Aids to General Pathology. By GILBERT A. BANNATYNE, M.D. Cloth, price 1s. 6d.; sewn, 1s.

Pathology. Aids to Special Pathology. By the same Author Cloth, price 2s. 6d.; sewn, 2s.

Pathology of Tuberculosis. (See Consumption.)

Pathology. Handbook of Surgical Pathology. Edited by W. J. WALSHAM, M.B., F.R.C.S., and D'ARCY POWER, M.B. Oxon., F.R.C.S. Second edition. Price 9s.

"An embodiment of the most modern pathological teaching."—*The Lancet.*

Pathology. Examination Cards. Arranged as questions and answers for self-examination. By A. T. SCHOFIELD, M.D., M.R.C.S. Complete in two sets of cards, price 9d. net per set.

Mr. Jonathan Hutchinson, F.R.C.S., writes: "It is an invaluable means of self-tuition."

Peritonitis. Localised Peritonitis: its Etiology, Diagnosis, and Treatment. By JOHN WALLACE, M.D., Professor of Midwifery in the Victoria University. Illustrated. Price 1s.

Pharmacopœia. A Vest-Pocket Epitome of the British Pharmacopœia. By RUSSELL COOMBE, M.A., F.R.C.S. Cloth, price 1s.

Pharmacopœia. The Pocket Pharmacopœia. A Précis of the British Pharmacopœia, including the Therapeutical Action of the Drugs, their Natural Orders and Active Principles. By C. ARMAND SEMPLE, M.D., M.R.C.P. Second edition, with the Appendix of 1890. Price 3s. 6d.

Pharmacopœia. Notes on the Pharmacopœial Preparations for Pharmaceutical Students. By HANDSEL GRIFFITHS; revised by A. S. GUBB, M.D. Paris, L.R.C.P., M.R.C.S., D.P.H. Price 3s. 6d.

Pharmacy. Latin Grammar of Pharmacy, for the use of Students, with an Essay on Latin Prescriptions. By JOSEPH INCE, A.K.C.L., formerly Examiner and Member of Council, Pharmaceutical Society. Fifth edition. Price 5s.

Pharmacy. Aids to Pharmacy. By C. E. ARMAND SEMPLE, M.B. Cantab., M.R.C.P. Lond. Cloth, price 2s. 6d.; paper, 2s.

Phimosis. Its Causes, Symptoms, and Treatment; with a description of the ancient rite of circumcision. By L. H. ORMSBY, M.D., F.R.C.S.I., Lecturer on Clinical and Operative Surgery at, and Surgeon to, the Children's Hospital, Dublin. Price 1s.

Physics. A Manual of Physics. Being an Introduction to the Study of Physical Science designed for University Students. By W. PEDDIE, D.Sc., F.R.S.E., Lecturer on Physics in the University of Edinburgh. (*University Series of Manuals.*) Price 7s. 6d.

"Altogether worthy of praise. . . . We have no hesitation in giving it high commendation. . . . We wish it all success, feeling well satisfied that it meets a decided want."—*Nature.*

Physiological Chemistry. Aids to Physiological Chemistry. By J. L. THUDICHUM, M.D., F.R.C.P. Lond., St. Thomas's Hospital. Cloth, price 2s. 6d. Wrapper, 2s.

Physiological Factor in Diagnosis. By J. MILNER FOTHERGILL, M.D., M.R.C.P. Lond., Physician to the City of London Hospital for Diseases of the Chest. Second edition. Price 7s. 6d.

Physiological Laboratory. Manual for the Physiological Laboratory. By VINCENT D. HARRIS, M.D., F.R.C.P., Examiner in Physiology, the Royal College of Physicians of London, and D'ARCY POWER, M.B. Oxon., Curator of Museum, St. Bartholomew's Hospital. Fifth edition. Price 7s. 6d.

"This manual is already well and favourably known, and the new edition contains many valuable additions."—*Lancet.*

Physiology. A Manual of Physiology. By G. N. STEWART, M.A., D.Sc. University of Cambridge. (*University Series of Manuals.*) [*In the Press.*

Physiology. The Physiologist in the Household. By J. MILNER FOTHERGILL, M.D., M.R.C.P. Part I.—Adolescence. Price 1s.

Physiology. Aids to Physiology. By B. THOMPSON LOWNE, F.R.C.S., Arris and Gale Lecturer, and Examiner in Physiology, Royal College of Surgeons of England. Fourth thousand, illustrated. In two parts, 2s. each, or in one vol., cloth, 4s. 6d.

"As 'aids' and not substitutes, they will prove of real value to students."—*Medical Press.*
"Certainly one of the best of the now popular 'Aid Series.'"—*Students' Journal.*

Plant Analysis. (See Chemistry.)

Polypus in the Nose and other Affections of the Nasal Cavity; their successful treatment. By J. L. W. THUDICHUM, M.D., F.R.C.P. Lond. Sixth edition. Price 1s.

Population. On the Evils, Moral and Physical, likely to follow, if practices, intended to act as checks to population, be not strongly discouraged and condemned. By C. H. F. ROUTH, M.D., F.R.C.P. Second thousand. Price 1s.

Posology. Posological Tables: a Classified Chart, showing at a glance the Dose of every Officinal Substance and Preparation. By HANDSEL GRIFFITHS, Ph.D., L.R.C.P. Fifth edition, revised by PETER W. SQUIRE, F.L.S., F.C.S. Price 1s.; or mounted on linen, rollers, and varnished, 3s. 6d.

Pregnancy. (See Obstetrics.)

Prescriptions. The Student's Pocket Prescriber. By H. AUBREY HUSBAND, M.B., F.R.C.S.E. Price 1s. cloth.

Psychological Medicine in John Hunter's Time and the Progress it has made. By FLETCHER BEACH, M.B., F.R.C.P. Price 1s.

Psycho-Therapeutics. (See Hypnotism.)

Public Health. Aids to Sanitary Science, for the Use of Candidates for Public Health Qualifications. By F. J. ALLAN, M.D., Dipl. Public Health, Camb., Assistant Professor of Hygiene, College of State Medicine. 236 pp., price 4s. 6d. cloth.

"A really admirable synopsis of what it is most necessary for a candidate to know."—*Glasgow Medical Journal.*

"The information contained is correct, well expressed and well arranged."—*Public Health.*

"The work has been well done. . . . Will be found a serviceable and reliable aid."—*Edinburgh Medical Journal.*

Public Health. The Practical Guide to the Public Health Acts and Correlated Acts for Officers of Health and Inspectors of Nuisances. By THOS. WHITESIDE HIME, B.A., M.B. Second edition, enlarged. [*In the Press.*

Public Health. Aids to Public Health. By J. L. THUDICHUM, M.D., F.R.C.P. Lond. Price 1s. 6d. cloth; 1s. paper wrapper.

Public Health. Guide to Sanitary Science Examinations. By HERBERT JONES, D.P.H. Cantab. Price 2s. 6d.

Pulse. How to feel the Pulse and what to Feel in it. Practical Hints for Beginners. By WILLIAM EWART, M.D., F.R.C.P. Lond., Physician to St. George's Hospital. With a glossary and twelve illustrations. Price 3s. 6d.

Pulse. The Sphygmograph: its History and use as an aid to Diagnosis. By R. E. DUDGEON, M.D. Price 2s. 6d.

Rabies. (See Hydrophobia.)

Rheumatism. Its Treatment by Electric Massage, etc., in connection with the Wiesbaden Thermal Waters. By CARL MORDHORST, M.D. Kiel. Price 1s.

Rupture of the Perineum. Its Causes, Prevention and Treatment. By MICHAEL JOSEPH MOLONY, M.R.C.P., L.R.C.S. Price 2s. cloth, 1s. 6d. paper.

Salt. History of Salt, with Observations on its Medicinal and Dietetic Properties. By EVAN MARLETT BODDY, F.R.C.S., F.S.S., L.R.C.P. Price 2s. 6d.

Sea-Sickness. Sea-Sickness, Cause, Prevention and Cure. Voyaging for Health, with an Appendix on Ship-Surgeons. By THOMAS DUTTON, M.D. Second edition, price 1s. 6d.

Sewage. The Sewage Question: Reports upon the Principal Sewage Farms and Works of the Kingdom, with Notes and Chemical Analyses. By the late Dr. LETHEBY. Price 4s. 6d.

Skin Diseases of Infancy and Early Life. By C. M. CAMPBELL, M.D., C.M. Edin. Price 5s.

Skin. A Synopsis of Diseases of the Skin and Hair. By R. GLASGOW PATTESON, M.B., Surgeon to St. Vincent's Hospital. Price 1s.

Skin. Dermic Memoranda: An Introduction to the Study of Skin Disease, with Special Reference to the Exanthemata. By WILLIAM GEMMEL, M.B., Resident Medical Officer, Glasgow Fever Hospital. Price 3s. net.

Skin. Scabies: its Causation, Diagnosis, and Treatment. By ARTHUR HARRIES, M.D. Price 6d.

Skin. Lupus. A Pathological and Clinical Investigation. By ARTHUR HARRIES, M.D., and C. M. CAMPBELL, M.D. Price 1s.

Skin. Some Diseases of the Skin produced by Derangements of the Nervous System. By T. STRETCH DOWSE, M.D., F.R.C.P.E. Price 2s.

Stomach. The Surgical Diseases and Injuries of the Stomach and Intestines. By F. BOWREMAN JESSETT, F.R.C.S., Surgeon to the Cancer Hospital. Numerous engravings. Price 7s. 6d.

Stricture. Stricture of the Urethra: its Diagnosis and Treatment. By E. DISTIN MADDICK, F.R.C.S. Edin., late Surgeon R.N. 4s.

Surgery. The Science and Practice of Surgery, a Complete Text-book. By F. J. GANT, F.R.C.S., Senior Surgeon Royal Free Hospital. Third edition, with nearly 1,100 engravings. 2 vols., price 36s.

"The entire work has been revised to present the modern aspects of Surgery."—*Lancet.*
"Does credit to the author's thorough surgical knowledge."—*British Medical Journal.*

Surgery. The Student's Surgery: a Multum in Parvo. By F. J. GANT, F.R.C.S. 850 pp., illustrated. Price 10s. 6d.

"It well fulfils the object for which it is written."—*Lancet.*
"From the student's point of view it is a necessity."—*British Medical Journal.*

Surgery. The Rules of Aseptic and Antiseptic Surgery, for the use of Students and General Practitioners, with 248 engravings and 3 chromo-lithographic plates. By A. G. GERSTER, M.D., Professor of Surgery at the New York Polyclinic. Price 15s.

Surgery. Operative Surgery on the Cadaver. By JASPER J. GARMANY, A.M., M.D., F.R.C.S. Price 8s. 6d.

Surgery. Aids to Surgery. By GEORGE BROWN, M.R.C.S. 2 parts, price 1s. 6d. cloth, and 1s. sewn, each; or in 1 vol., 2s. 6d.

Surgery. The Text-book of Operative Surgery. With 88 beautifully engraved steel plates, after BERNARD and HUETTE. Text by ARTHUR TREHERN NORTON, F.R.C.S., Surgeon to, and Lecturer on Surgery at, St. Mary's Hospital. Second edition, half calf, plain, 25s.; hand-coloured, 50s.

"Of the highest merit as a guide to operative surgery."—*Students' Journal.*

Surgery. Annals of Surgery. A monthly Review of Surgical Science and Practice, published simultaneously in America and London. Edited by L. S. PILCHER, M.D., and FREDERICK TREVES, F.R.C.S. Eng. Price 2s., or 21s. per annum post free.

Surgery. The Anatomy of Surgery. By JOHN MCLACHLAN, M.B., M.R.C.S. With 74 illustrations. Two vols., price 18s.

Surgery. The Surgery of the Knee-Joint, and the Responsibility placed on the Physician and General Practitioner by the Modern Process of Surgery. By C. B. KEETLEY, F.R.C.S., Senior Surgeon to the West London Hospital, and Surgeon to its Orthopædic Department. Cloth, price 1s. 6d.

Surgery, Minor—and Bandaging. Questions and Answers for Self-examination. By A. T. SCHOFIELD, M.D. Price 9d. net.

Surgical Pathology. Handbook of Surgical Pathology. By W. J. WALSHAM, M.B., F.R.C.S., and D'ARCY POWER, M.B., F.R.C.S. Second edition. Price 9s.

"An embodiment of the most modern pathological teaching."—*The Lancet.*

Surgical Anatomy. (See Surgery.)

Surgical Treatment. Notes on Surgical Treatment and Minor Operations. Designed especially for House Surgeons and Students. By T. F. HOPGOOD, L.R.C.P., M.R.C.S. Surgeon to the Sunderland Infirmary. Price 2s. 6d.

Syphilis. Tables for the Diagnosis and treatment of Syphilis. By J. K. BARTON, M.D., F.R.C.S.I. Third edition. Price 1s. 6d. net.

Syphilis. The Nature and Treatment of Syphilis, and the other so-called Contagious Diseases. By C. R. DRYSDALE, M.D., M.R.C.P. Lond., F.R.C.S. Eng. Fifth edition. Price 5s.

Temperature Charts for Recording the Range of Temperature, Pulse, Respiration, History, Progress, and Treatment of Cases. By E. W. MOORE, M.D., M.R.C.P. Price 1d. each, 9d. per dozen; or mounted, similar to a blotting-pad, 50, 3s. 6d.; 100, 7s.

Theories of Life. The Protoplasmic Theory of Life. By JOHN DRYSDALE, M.D., F.R.M.S. Price 5s.

Theories of Life. How to Prolong Life. Showing the Diet and Agents best adapted for a lengthened prolongation of existence. By C. W. DE LACY EVANS, M.R.C.S. Second edition. Price 5s.

"A good account of the changes which occur with the advance of age."—*Lancet.*

Therapeutics. Modern Therapeutics, Medical and Surgical, including the Diseases of Women and Children. By GEO. H. NAPHEYS, A.M., M.D. Ninth edition. Revised and enlarged by Drs. Allen Smith and Aubrey Davis. Vol. I.—Medical. Price £1 10s. [*In the Press.*

Therapeutics. The Therapeutics of the Respiratory Passages. By PROSSER JAMES, M.D., Lecturer on Materia Medica and Therapeutics at the London Hospital. Price 10s. 6d.

"Dr. Prosser James has produced a scholarly treatise."—*New York Medical Record.*

Therapeutics. Aids to Rational Therapeutics, for the guidance of Practitioners and Senior Students. By J. MILNER FOTHERGILL, M.D. Second edition. Price 2s. 6d. cloth; 2s. paper wrapper.

Throat. Movable Atlas of the Throat, and the Mechanism of Voice, Speech and Taste. By Prof. WITKOWSKI. (See Anatomy.)

Throat. Diseases of the Throat and Nose. A Practical Guide to Diagnosis and Treatment. With 220 typical illustrations in chromo lithography and numerous wood engravings. By LENNOX BROWNE, F.R.C.S. Edin., Senior Surgeon to the Central London Throat and Ear Hospital. Fourth edition. [*In the Press.*

"One of the completest treatises on diseases of the throat in any language."—*British Medical Journal.*

"The best text-book in the English language."—*Edinburgh Medical Journal.*

Throat. Affections of the Throat and Larynx. By ARTHUR TREHERN NORTON, F.R.C.S., Surgeon to St. Mary's Hospital. Second edition, illustrated. Price 6s.

"Short, simple, and thoroughly practical nstruction."—*Medical Press.*

Throat. Laryngoscopy and Rhinoscopy: in the Diagnosis and Treatment of Diseases of the Throat and Nose. With hand-coloured plates and woodcuts. By PROSSER JAMES, M.D., M.R.C.P. Fifth edition. Price 6s. 6d.

Throat. Tonsillitis in Adolescents. By C. HAIG-BROWN, M.D. C.M., Medical Officer to the Charterhouse. Price 3s.

Transfusion. On Transfusion of Blood and Saline Fluids. By C. EGERTON JENNINGS, F.R.C.S. Third edition, with Preface by SIR SPENCER WELLS, Bart. Price 4s. 6d.

Tuberculosis. (See Consumption.)

Urinary Diseases. Diseases of the Bladder, Prostate Gland, and Urethra. By F. J. GANT, F.R.C.S., Senior Surgeon to the Royal Free Hospital. Fifth edition, enlarged. Price 12s. 6d.

"The work throughout bears evidence of having been written by a thoroughly practical and experienced surgeon."—*Lancet.*

Urine. The Urine in Health and Disease, its Chemical Examination, etc. By H. AUBREY HUSBAND, M.B., B.Sc., F.R.C.S. Second edition. Price 1s. net.

Urine. The Urine; a Guide to its Practical Examination. By J. TYSON, M.D., Professor of Morbid Anatomy in the University, and President of the Pathological Society of Philadelphia. Fifth edition, with numerous illustrations. Price 7s. 6d.

"We think it the most practically useful guide we have on the subject."—*Medical Record.*

Vichy. Vichy and its Therapeutical Resources. By PROSSER JAMES, M.D., M.R.C.P. Lond., Lecturer on Materia Medica and Therapeutics at the London Hospital. Price 2s. 6d.

Voice. The Philosophy of Voice. Showing the right and wrong Action of the Breath and Vocal Cords in Speech and Song. By CHARLES LUNN. Sixth edition. Price 3s.

Voice. Artistic Voice in Speech and Song. Dedicated to Mr. Sims Reeves and Mr. Santley. By the same Author. 1s.

Voice. The Voice Musically and Medically Considered. By C. ARMAND SEMPLE, M.B. Cantab., M.R.C.P. Lond., Physician to the Royal Society of Musicians. Part I. Musical, price 1s.; Part II., Medical, price 2s.; or in one vol., cloth, 3s. 6d.

Whooping-Cough. Its Pathology and Treatment. Fothergillian Prize Essay. By THOS. M. DOLAN, M.D., F.R.C.S.E. Price 3s. 6d.

Zoology and Comparative Anatomy, Aids to. By MAJOR GREENWOOD, M.D., Honours. Price 2s. 6d., and 2s.

THE STUDENTS' AIDS SERIES.

Specially designed to assist Students in committing to memory and grouping the subjects upon which they are to be examined.

Aids to Analysis of Food and Drugs. By H. AUBREY HUSBAND, M.B., F.R.C.S. Price 1s. 6d. cloth; 1s. paper.

Aids to Anatomy. By GEORGE BROWN, M.R.C.S., Gold Medallist, Charing Cross Hospital. Price 1s. 6d. cloth; 1s. paper

Aids to Botany. By C. E. ARMAND SEMPLE, B.A., M.B. Cantab., M.R.C.P. Lond., late Senior Examiner in Arts at Apothecaries' Hall. Third thousand. Price 2s. 6d. cloth; 2s. paper wrapper.

Aids to Chemistry. By the same Author.
Part I.—Inorganic: Non-Metallic Substances. 2s. 6d. and 2s.
Part II.—Inorganic: The Metals. 2s. 6d. cloth; 2s. paper.
Part III.—Organic. Price, cloth 2s. 6d.; paper 2s.
Part IV.—Tablets of Chemical Analysis. 1s. 6d., 1s.

Aids to Practical Chemistry. Especially arranged for the Analysis of Substances containing a Single Base and Acid Radicle. By T. HURD GORDON. Price 2s. 6d. cloth; 2s. paper.

Aids to Dental Surgery. By ARTHUR S. UNDERWOOD, M.B., M.R.C.S., Lecturer on Dental Surgery at the Dental Hospital of London. Price 2s. 6d. cloth; paper wrapper 2s.

Aids to Dental Histology. By the same Author. Illustrated. Price 2s. 6d. cloth; 2s. paper wrapper. 1892.

Aids to Diagnosis. Part I.—Semeiological. By J. MILNER FOTHERGILL, M.D., M.R.C.P. Lond. Price 1s. 6d. cloth; 1s. paper.
Part II.—Physical. By J. C. THOROWGOOD, M.D., F.R.C.P. Lond. Price 1s. 6d. cloth; 1s. paper wrapper.
Part III.—What to Ask the Patient. By J. MILNER FOTHERGILL, M.D., M.R.C.P. Lond. Price 1s. 6d. cloth; 1s. paper. The three in one vol., 3s. 6d.
"A mine of valuable information."—*Edinburgh Medical Journal.*

Aids to Examinations. Being Questions and Answers on Materia Medica, Medicine, Midwifery, Pathology, etc. By W. DOUGLAS HEMMING, F.R.C.S., and H. AUBREY HUSBAND, M.B., F.R.C.S. Third thousand. Price 1s. 6d. cloth; and 1s. paper.

Aids to Forensic Medicine and Toxicology. By W. D. HEMMING, F.R.C.S.E., and H. AUBREY HUSBAND, M.B., F.R.C.S.E. Third thousand. Price 2s. 6d. and 2s.

Aids to Gynæcology. By ALFRED GUBB, M.D. Paris, M.R.C.S., L.R.C.P., D.P.H., Obstetric Assistant and Gold Medaliist, Westminster Hospital. Cloth, price 2s. 6d.; sewn, 2s.

Aids to Materia Medica and Therapeutics. By C. E. ARMAND SEMPLE, B.A., M.B. Cantab., M.R.C.P. Lond.

Part I.—The Non-Metallic and Metallic Elements, Alcoholic and Ethereal Preparations. 2s. 6d. cloth; and 2s. paper.
Part II.—Vegetable and Animal Substances, 2s. 6d. and 2s.
Part III.—Classification of Remedies, 1s. 6d. and 1s.
Part IV.—New Remedies. 2s. 6d. and 2s.
Part V.—Tablets of Materia Medica. Price 1s. 6d. and 1s.

Aids to Medicine. By the same Author.
Part I.—General Diseases. Lungs, Heart, and Liver. Price 2s. 6d. and 2s.
Part II.—The Urine, Kidneys, etc. 2s. 6d. and 2s.
Part III.—The Brain and Nervous System. 2s. 6d. and 2s.
Part IV.—The Fevers, Skin Diseases, etc. Price 2s. 6d. and 2s.

Aids to Obstetrics. By SAMUEL NALL, B.A., M.B. Cantab., M.R.C.P. Lond., late House Physician and Resident Obstetric Assistant, St. Bartholomew's Hospital. Twelfth thousand. Price 2s. 6d. and 2s.

Aids to Ophthalmic Medicine and Surgery. By JONATHAN HUTCHINSON, jun., F.R.C.S. Cloth, 2s. 6d.; sewn, 2s.

Aids to General Pathology. By GILBERT A. BANNATYNE, M.D. Cloth, 1s. 6d.; sewn, 1s.

Aids to Special Pathology. By the same Author. Cloth, 2s. 6d.; sewn, 2s.

Aids to Pharmacy. By C. E. ARMAND SEMPLE, B.A., M.B. Cantab., M.R.C.P. London. Cloth, price 2s. 6d.; paper wrapper, 2s.

Aids to Physiology. By B. THOMPSON LOWNE, F.R.C.S., Examiner in Physiology, Royal College of Surgeons. Fourth thousand. In two parts, price 2s. each; or in one vol., cloth, 4s. 6d.
"Certainly one of the best of the now popular Aids Series."—*Students' Journal.*

Aids to Practical Physiology. By J. BRINDLEY JAMES, M.R.C.S. Price 1s. 6d. cloth; 1s. paper.

Aids to Physiological Chemistry. By J. L. THUDICHUM, M.D., F.R.C.P. Lond., formerly Lecturer on Physiological Chemistry, St. Thomas's Hospital. Price 2s. 6d. and 2s.

Aids to Psychological Medicine. By L. S. FORBES WINSLOW, M.B., D.C.L. Oxon. Price 1s. 6d. and 1s.

Aids to Public Health. By J. L. THUDICHUM, M.D., F.R.C.P. Lond. Price 1s. 6d. cloth, 1s. paper.

Aids to Sanitary Science for the Use of Candidates for Public Health Qualifications. By F. J. ALLAN, M.D., Assistant Professor of Hygiene, Coll. State Medicine. 236 pp. Price, cloth, 4s. 6d.; or in two parts, sewn, 2s. each.

Aids to Surgery. In two parts. By GEORGE BROWN, M.R.C.S. Price 1s. 6d. cloth, and 1s. paper, each; or in one vol., cloth, 2s. 6d.

Aids to Rational Therapeutics. By J. MILNER FOTHERGILL, M.D., M.R.C.P. Lond. Price 2s. 6d. and 2s.

Replies to Questions in Therapeutics. By BRINDLEY JAMES, M.R.C.S. Price 1s. 6d. cloth, 1s. paper wrappers.

Aids to Zoology. By MAJOR GREENWOOD, M.D. Honours in Zoology, University of London. Price 2s. 6d. and 2s.

Aids to Analytical Geometry.

The Straight Line and Circle. By A. LE SUEUR, B.A. Cantab. Second edition. Price 2s.

The Conic Sections, with solutions of questions set at the London and other University Examinations. By GEORGE HEPPEL, M.A., St. John's College, Cambridge, Member of London Mathematical Society. Price 2s.

WORKS
ON
VETERINARY MEDICINE AND SURGERY.

Amateur. Horses: their Rational Treatment and the Causes of their Premature Decay. By AMATEUR. Price 5s.

——— An Abridgment of the above. By the same Author. Price 1s.

Banham. Tables of Veterinary Posology and Therapeutics. With Weights, Measures, etc. By Professor GEORGE A. BANHAM, F.R.C.V.S. Price 2s. 6d.

Beacock. Prize Essay on the Breeding, Rearing, and Fattening of Cattle and Sheep, and proper treatment of Cows at time of Calving. By JOSEPH BEACOCK. Price 3d.

Burke. The Tropical Diseases of the Horse. By Captain R. W. BURKE, M.R.C.V.S., A.V.D. Third edition. [*In the Press.*

Burness—Mavor. The Specific Action of Drugs, an Index to their Therapeutic Value. By A. G. BURNESS and F. MAVOR, President of the Central London Veterinary Society. Price 10s. 6d.

Courtenay. The Practice of Veterinary Medicine and Surgery. By E. COURTENAY. Price 10s. 6d.

"Written in a clear and concise style: will form a welcome addition to the library of the horse-owner, and those who take an interest in domesticated animals generally."—*Mark Lane Express.*

Fleming. A Text-Book of Veterinary Obstetrics, including the diseases and accidents incidental to pregnancy, parturition and early age in the Domesticated Animals. By GEORGE FLEMING, C.B., LL.D., F.R.C.V.S., F.R.G.S., President of the Royal College of Veterinary Surgeons, late Principal of the Army Veterinary Department. Profusely illustrated. Cloth, price 30s.

"Has filled up a void in a more satisfactory and complete way than any other member of his profession could have done."—*The Field.*
"No man who makes any pretensions to veterinary science or stock breeding can dispense with this work."—*Live Stock Journal.*

Fleming. Parasites and Parasitic Diseases of the Domesticated Animals. A Treatise by L. G. NEUMANN, Professor at the National Veterinary School of Toulouse. Translated and Edited by GEO. FLEMING, C.B., LL.D., F.R.C.V.S., with 365 illustrations. Price 25s.

"Cannot fail to be of immense value to both the veterinary profession and to British stock-breeders."—*Bell's Weekly Messenger.*

Fleming. A Text-Book of Operative Veterinary Surgery. Part I., price 10s. 6d. Part II. [*In the Press.*

——— The Contagious Diseases of Animals: their influence on the wealth and health of the nation. Price 6d.

——— Animal Plagues; their History from the Earliest Times, Nature, and Prevention. Vol. I., to 1800. Price 15s.

——— Vol. II., from A.D. 1800 to 1844. Price 12s.

——— Actinomykosis. An Infectious Disease of Animals and Mankind. Price 1s.

——— On Roaring in Horses (**Laryngismus Paralyticus**). Its History, Pathology, and Treatment. With coloured plate and woodcuts. Price 6s.

——— Tuberculosis from a Sanitary and Pathological point of view. Price 1s.

——— Human and Animal Variolæ. A Study of Comparative Pathology. Price 1s.

——— Practical Horse Shoeing. With 37 illustrations. 2s.

——— The Influence of Heredity and Contagion on the Propagation of Tuberculosis. By G. FLEMING, F.R.C.V.S., HERR A. LYDTIN, and M. VAN HERTSEN. Price 6s.

Gresswell. A Manual of the Theory and Practice of Equine Medicine. By J. BRODIE GRESSWELL, F.R.C.V.S., and ALBERT GRESSWELL, M.R.C.S. Eng. Second edition, enlarged. Price 10s. 6d.

BY THE SAME AUTHORS.

Equine Hospital Prescriber. Second edition. Price 2s. 6d.

Bovine Prescriber. Price 2s. 6d.

Veterinary Pharmacopœia. Materia Medica and Therapeutics. Price 10s. 6d.

Diseases and Disorders of the Horse. A Treatise on Equine Medicine and Surgery. Price 5s.

Hill. Principles and Practice of Bovine Medicine and Surgery, with woodcuts and coloured plates. By J. WOODROFFE HILL, F.R.C.V.S. Price 36s.

———The Management and Diseases of the Dog. By J. W. HILL, F.R.C.V.S. Third edition. Illustrated. Price 7s. 6d.

Lambert. The Germ Theory of Disease, Concisely and Simply Explained. By Colonel JAMES LAMBERT, F.R.C.V.S., Army Veterinary Department. Price 1s.

Liautard. Animal Castration. By A. LIAUTARD, M.D., H.F.R.C.V.S. Price 7s. 6d.

——— Lameness of Horses and Diseases of the Locomotor Apparatus. Price 10s. 6d.

Lupton. The Horse: its Examination and Law of Warranty. By JAMES IRVINE LUPTON, F.R.C.V.S. [*In the Press.*

Miller—Tellor. The Diseases of Live Stock, and their most efficient remedies. A Popular Guide for the Medical and Surgical Treatment of all Domestic Animals, including Horses, Cattle, Cows, Sheep, Swine, Fowls, Dogs, etc. By WM. B. E. MILLER, D.V.S., President of U.S. Veterinary Association, WILLIS P. HAZARD, A. LIAUTARD, M.D., F.R.C.V.S., and LLOYD V. TELLOR, M.D. Price 10s. 6d.

McBride. Anatomical Outlines of the Horse. By J. A. MCBRIDE, Ph.D., M.R.C.V.S. Third edition. Illustrated. Price 8s. 6d.

Meyrick. Stable Management and the Prevention of Diseases among Horses in India. By J. J. MEYRICK, C.B., A.V.D., F.R.C.V.S., Principal Army Veterinary Surgeon in Egypt. Formerly Superintendent of Horse Breeding for the Punjab. 2s. 6d.

Neumann's Parasites and Parasitic Diseases of the Domesticated Animals. (See Fleming.)

Poyser. The Stable Management of Troop Horses in India. "The Collinsian" Prize Essay. By Major R. POYSER, A.V.D., F.R.C.V.S. Price 2s.

Reynolds. The Breeding, Rearing, and Management of Draught Horses. By RICHARD REYNOLDS, M.R.C.V.S. Price 3s. 6d.

Robertson. A Handbook of the Practice of Equine Medicine. By WM. ROBERTSON, F.R.C.V.S., late Principal of the Royal Veterinary College, London. Second edition. Price 25s.

Smith. A Manual of Veterinary Hygiene. By Captain FREDERICK SMITH, A.V.D., M.R.C.V.S., Lecturer on Veterinary Hygiene in the Army Medical School, Aldershot. Price 10s. 6d.

——— A Text-Book of Veterinary Physiology. By the same Author. [*In the Press.*

Veterinary Diagrams in Tabular Form. With coloured and plain engravings. Size of sheet 28½ by 22 inches.

No. 1.—The External Form and Elementary Anatomy of the Horse. Price 3s. 6d., or mounted on roller and varnished, 6s. 6d.

No. 2.—The Age of Domestic Animals. Price 2s. 6d., or mounted on roller and varnished, 5s. 6d.

No. 3.—The Unsoundnesses and Defects of the Horse. Price 2s. 6d., or mounted on roller and varnished, 5s. 6d.

No. 4.—The Shoeing of the Horse, Mule and Ox. Price 2s. 6d., or mounted on roller and varnished, 5s. 6d.

No. 5.—The Elementary Anatomy, Points and Butcher's Joints of the Ox. Price 3s. 6d., or mounted, 6s. 6d.

Price per set of Five, 12s.; or mounted, 27s.